WEIGHT/SIZE STRUCTURE OF ATLANTIC BLUEFIN TUNA FISHED AND/OR RANCHED IN THE MEDITERRANEAN AND NORTHEAST ATLANTIC DURING THE PERIOD 1995 TO 2014 AS REVEALED BY TRADE, MARKET & CORPORATE BIOMETRIC DATA

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SUMMARY

For a number of years, both ICCAT-SCRS and ICCAT-GBYP have examined the possible use of auction, trade and marked data for scientific purposes.[2] These data are currently not used by scientists and not included in the ICCAT data base because of the need to closely check them, for avoiding uncertainties such as double-counting, use of various types of conversion factors, representativeness of various age classes on the Japanese markets, data coverage, sample representation and many others. The Informal Group on Trade-Market Data which was set during the 2012 Bluefin tuna Assessment Meeting, the SCRS and the GBYP Steering Committee agreed that these important data should be examined by a group of experts, for selecting the reliable and documented data, using all sources for validation, including BCDs, and for making them available to the SCRS scientists. Here, comprehensive trade, market and tuna ranching corporate information, including a vast record of Atlantic Bluefin tuna specimens (with individual and grouped disclosed information on weight/size) that were fished and/or ranched in the Northeast Atlantic and Mediterranean Sea, from 1995 to 2014, has been recovered and herein presented, to the SCRS. Three distinct sets of data (form 1, forms 2 (a & b) and forms 3 (a & b)) are herein presented for ICCAT-SCRS' evaluation and analysis. All such three sets have been standardized in order to comply with SCRS' data and statistics format requirements and are delivered in MS EXCEL format.

RÉSUMÉ

Pendant un certain nombre d'années, le SCRS de l'ICCAT tout comme le GBYP de l'ICCAT ont envisagé l'emploi éventuel des données des ventes à la criée et du commerce à des fins scientifiques. Ces données ne sont pas actuellement utilisées par les scientifiques et ne figurent pas dans la base de données de l'ICCAT car elles doivent faire l'objet d'une rigoureuse vérification afin d'éviter les incertitudes, comme la double comptabilisation, l'emploi de divers types de facteurs de conversion, le caractère représentatif de diverses classes d'âges sur les marchés japonais, la couverture des données, la représentation des échantillons et bien d'autres. Le Groupe informel sur les données commerciales et les marchés qui a été établi pendant la réunion d'évaluation du thon rouge de 2012, le SCRS et le comité directeur du GBYP ont convenu que ces données importantes devraient être examinées par un groupe d'experts pour sélectionner les données fiables et documentées, en utilisant toutes les sources de validation, dont les BCD, et pour les mettre à la disposition des scientifiques du SCRS. Ici, on a récupéré et présenté au SCRS des informations exhaustives sur le commerce, le marché et l'engraissement des thonidés, y compris un vaste registre de spécimens de thon rouge de l'Atlantique (avec des informations individuelles et groupées sur le poids/taille) qui ont été pêchés et/ou engraissés dans l'Atlantique Nord-Est et la Méditerranée, de 1995 à 2014. Trois jeux de données distincts (formulaire 1, formulaires 2 (a & b) et 3 (a & b)) sont présentés aux fins de l'évaluation et de l'analyse du SCRS de l'ICCAT. Ces trois jeux ont été standardisés afin de respecter les exigences du SCRS en matière de format des statistiques et des données et sont fournis dans le format MS EXCEL.

RESUMEN

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[2] This was discussed during the BlueFin Tuna Assessment meeting in 2012 (http://www.iccat.int/Documents/Meetings/Docs/2012_BFT_ASSESS.pdf, pages 96-102) and then by the GBYP Steering Committee in its meeting in December 2012 (http://www.iccat.int/GBYP/Documents/GBYP_STEERING%20COM_REPORT_DEC_2012_SETE.pdf , page 11).

Para algunos años, el SCRS de ICCAT y el ICCAT-GBYP han examinado la posibilidad de utilizar los datos comerciales, de mercados y de subastas para fines científicos. Actualmente estos datos no son utilizados por los científicos ni se incluyen en las bases de datos de ICCAT debido a que es necesario realizar una comprobación minuciosa para evitar incertidumbres como la duplicación, utilización de diferentes tipos de factores de conversión, representatividad de las diferentes clases de edad en los mercados japoneses, cobertura de datos, representación de la muestra y muchas otras. El grupo informal sobre datos de mercado-comercio, que se estableció durante la reunión de evaluación de stock de atún rojo de 2012, el SCRS y el Comité directivo del GBYP acordaron que estos importantes datos deberían ser examinados por un grupo de expertos, para seleccionar los datos fiables y documentados, utilizando todas las fuentes para la validación, lo que incluye los datos de los BCD, y deberían ponerse a disposición de los científicos del SCRS. Aquí, se han recuperado y presentado al SCRS informaciones exhaustivas sobre comercio, mercados y cría corporativa de atún, lo que incluye un amplio registro de ejemplares de atún rojo (con información individual y agrupada sobre peso/talla) que fueron capturados y/o criados en el Atlántico nororiental y Mediterráneo desde 1995 a 2014. En el documento se presentan tres conjuntos diferenciados de datos (formulario 1, formulario 2 (a y b) y formulario 3 (a y b)) para que sean evaluados y analizados por el SCRS de ICCAT. Dichos tres conjuntos han sido estandarizados para que cumplan con los requisitos de formato de estadísticas y datos del SCRS y se han presentado en formato MS Excel.

KEYWORDS

Thunnus thynnus, Biometrics, Market, Trade, Data set

1. Introduction

Latest analyses on the status of Atlantic Bluefin tuna (Thunnus thynnus) populations carried out by the ICCAT-SCRS in 2006 and 2009 (ICCAT, 2007; SCRS, 2009) pointed out to a rapid deterioration of the Eastern Atlantic stock. In particular, the analyses describe a sharp increase of fishing mortality over the large spawner fraction of the population (age 8+) in recent years, which is attributed to the high purse seine catches driven by the increasing demand for large live fish by Mediterranean tuna farms (ICCAT, 2007). Scientists involved in past assessments of the East Atlantic Bluefin tuna stock have repeatedly expressed concern on the reliability of the data record available, making reference to the complex biology of the species and the poor quality of fisheries dependent data, among other factors.

Here, the author in conjunction with GBYP, brings to the attention of the scientific community a three new sets of largely ignored data because of their unavailability in the past: accurate and comprehensive information from ICCAT itself, tuna Ranching companies as well as from the world's main market, Japan. It is to be noted that for reasons explained at a later stage of this report, all three data sets pertain only to Eastern Stock (NEA+MEDI) Bluefin tuna; therefore not including information pertaining to Western Stock Bluefin tuna. Such three data sets focus on the last twenty years of fisheries of this species in the Northeast Atlantic and Mediterranean Sea, that is the period during which tuna ranching became a widespread practice inside the Mediterranean, and strong concerns were raised on the rapid deterioration of the large mature spawner fraction of the population, despite ICCAT's adoption of ever stringent fishery management compliance and control measures. The incorporation of these three new sets of data, collected by the author for and on behalf of GBYP, to ICCAT's database on Bluefin Tuna, will, no doubt, not only support the improvement of ICCAT Atlantic-Wide Research Programme on Bluefin tuna basic data collection, but likewise will also support the improvement of future assessment analytical work on demographic trends of the Atlantic Bluefin tuna population inhabiting the North-eastern Atlantic Ocean and the Mediterranean Sea during its spawning season.

2. Data sets, data extraction and assumption methods

Three independent data sets were compiled (and compiled into three MS EXCEL spreadsheets) and are here proposed for independent revision and validation. In all cases, no back calculation of wild weight at catch (Ww/c) was performed, though some hints as to fattening and growth ratios are commented.

It is to be noted that neither one of all three data sets, contains data pertaining to NEA+MEDI Bluefin tuna catches by the Japanese LL fishing fleet operative in the Northeast Atlantic and the Mediterranean Sea during the studied period. Since such catches are performed by Japanese flagged vessels, most catches are blast-frozen onboard, to be then transhipped or offloaded and reloaded at free-ports such as Las Palmas, and then shipped to Japan either onboard reefer vessels or packed on freezer 40' containers. Such flux of fish cannot be considered as export and does not appear in any of consulted trade documentation for the purpose of this report.

-. form1a_dsTradeBFTfresh (F) Japan Auction Markets

2.969 different daily auction market reports (produced by Japanese auction market fish wholesalers such as Tohto Suisan Co. Ltd. and Daito Gyorui Co. Ltd. were analyzed; pertinent data to auctioned BFT, belonging to the Eastern Stock, were extracted and adequately formatted to SCRS format requirements. Raw data, that is, copy of all of such daily market reports, can be found in annexed folder: **form1 RawData**

Eastern Stock auctioned Bluefin tunas

Individual information from 2000 to 2012, for a total of 209.491 fish (that is Bluefin tunas caught either in the Northeast Atlantic or inside the Mediterranean Sea), was extracted from daily auction records of all 64 major Japanese fish auction markets belonging to the 21 locations of Chiba, Fukuoka, Funabashi, Ishikawa, Kanazawa, Kawagoe, Kawasaki, Kobe, Kouriyama, Kyoto, Nagoya, Oota, Osaka, Saitama, Sapporo, Sendai, Senju, Siogama, Tokyo, Yamagata and Yokohama.

Auction market coverage for data set **form1a_dsTradeBFTfresh (F) Japan Auction Markets** corresponds to 100% of all existing major Japanese fish auction markets. Gathered data includes most of Northeast Atlantic or Mediterranean Sea Bluefin tunas imported to Japan and auctioned fresh in the above-mentioned Japanese markets, though the degree of auctioned BFTs coverage is dependent on the statistical validity of the reports as such. We believe such coverage to be high to very high though not 100% complete; this is due to the fact that a certain volume of fish might have been sold at such markets, though without going through the auction procedure and therefore not having been recorded as having been auctioned. The percentage of such volume of fish, though believed to be low, is nevertheless unknown.

Data extraction and assignment of assumed complementary data, where such data is not expressly disclosed in form1 RawData records.

The following complementary data assumptions/assignments for auctioned individual E-BFT were processed as follows and in such order:

*** Assumption/assignment of individual E-BFT presentation at auction**

Auction market daily reports contained in form1 RawData records do not contain information as to the precise presentation per specimen having been auctioned fresh, other than when the auctioned product is "Haramo", that is Belly Meat (BM and/or OT meat). Daily market reports do identify such presentation and such presentation only.

The following assumptions can nevertheless be made comfortably since based on industry traditional fresh fish presentation choices, depending on weight:

For E-BFTs traded fresh below 70 kgs, fish is traditionally traded gilled and gutted (GG)

For E-BFTs traded fresh above 70 kgs, fish is traditionally traded dressed (DR).

No fresh filleted or loined E-BFTs are auctioned at Japanese major fish auction markets.

*** Assumptions with regards to E-BFT Belly Meat (BM and/or OT meat) auctioned Fresh (F)**

Auctioned fresh E-BFT "Haramo" Belly Meat is negligible in terms of number of specimens and in terms of auctioned weight.

The introduction of such fish into **form1a_dsTradeBFTfresh (F) Japan Auction Markets**, may nevertheless raise the legitimate issue of double-counting as there is no effective method to determine whether or not such BM and/or OT meat having been auctioned fresh in Japan on one hand, may correspond to either E-BFT that was simply not marketed or to E-BFT having been filleted/loined and exported separately to another market.[3]

Since, as stated before, no fresh filleted or loined E-BFTs are auctioned at Japanese major fish auction markets, it is safe to state that no double counting issue within **form1a_dsTradeBFTfresh (F) Japan Auction Markets**, may be raised here.

*** Assumption/assignment of individual E-BFT wild/ranched nature and catch fishing gear**

Auction market daily reports contained in form1 RawData records contain specific information as to the precise nature for each fish having been auctioned.

When the auctioned fish carries the mentioned "FARM" it is obvious that the fish was purseined and transferred- live into fattening cages. The assigned fishing gear for all of these fish is therefore: PS.

This is with the exception of auctioned BFTs which origin is Portugal and carry the mention "FARM" in which case the assigned fishing gear is TRAP. The reason for this assumption is that Portugal did not operate a PS BFT fishing and transferring fishing fleet. The only known Portuguese BFT producer to market ranched product, operates a Japanese-type fixed trap-net. The assigned fishing gear for all of such fish is therefore: TRAP.

When the auctioned fish does not carry the mentioned "FARM" it is assumed that the fish was caught "Wild".

In such cases, auctioned fish may carry the mentioned "TRAP" or "L Line". For such fish, the specific assigned fishing gear per specimen is "TRAP" or "LL".

When auction wild-caught BFT specimens do not carry any mention as to the specific used fishing gear, the general initial assumption is that such fish may have not been purseined for the reason that wild-caught PS BFT meat quality is normally unfit for auction at high-end top quality markets such as the Japanese fresh auction fish markets.

PS Wild-caught BFT normally suffers from severe skin damage and/or of "yake", that is the browning of fish muscular-flesh tissue due to lactic acidosis phenomena as the fish is put to death inside the net, usually in summer hot seawater columns. Such fish is typically destined either for frozen (FR) production and/or for less choosier markets. The later also applies for such BFT specimens that would have incidentally been caught by either mid-water trawlers (MWT) or by harpoon fishing vessels.

Since the assumption is therefore that such BFT specimens were neither PS, TRAP or MWT wild-caught, it is safe to assume that they were caught by means of line fishing gears.

This much is further confirmed by the fact that Fresh auctioned BFT must have been caught, for self explaining reasons, no later than a maximum of seven days prior to the date of its auction in Japan. The date of auction, therefore serves as an important reference, allowing to robustly identify whether every specific specimen was or was not caught within the BFT PS summer fishing season (May to July)

In any event the assumption is that all of such fish was longlined and the assigned fishing gear for all of these fish is therefore: LL.

*** Assumption/assignment of geographical area of catch at sea per specimen**

Auction market daily reports contained in form1 RawData records do not contain information as to the precise geographical area of catch at sea per specimen having been auctioned fresh.

[3] According to industry sources, BM and OT E-BFT meat, corresponding to ≈8% of long-line and purse-seine Wild-caught E-BFT for a given year, is exported on its own to Japan, since the rest of the meat is generally not suitable for such market.
The amount of ranched E-BFT BM and OT exported to Japan has been historically minimal (less than 2%).

The assumption that all extracted individual information from 2000 to 2012 contained in form1 RawData (for a total of 209.491 fish) necessarily corresponds to Eastern Stock BFT, relies on the following facts:

With regards to "FARM" / Ranched BFT, it is clear and obvious that no Western Stock BFT was ever caught and transferred-live into Tuna Ranches located inside the Mediterranean Sea;

With regards to "TRAP" / Set netted BFT, it is clear and obvious that no Western Stock BFT was ever caught by any of the Eastern Atlantic (Morocco, Spain & Portugal) or Mediterranean Sea (Spain, Italy, Libya) trap net operators;

With regards to other fishing gears, it is recorded and accepted that Mediterranean coastal states' BFT fishing fleets (namely PS and LL fishing fleets) operate within the boundaries of the Mediterranean Sea (MEDI). Two exceptions may be pointed out at this stage:

A negligible number of Libyan flagged LL fishing vessels operated in the past from the port of Las Palmas (Spain) operative both in and outside the Mediterranean Sea and for which no auction data contained in form1 RawData records could be associated to. Such Libyan flagged LL vessels are all Japanese reflagged LL fishing vessels and therefore it is safe to assume that most, if not the entirety, of their catches would be blast-frozen onboard, therefore never reaching the Japanese Fresh (F) auction markets;

Fishing fleets flagged to Morocco, Spain and France, that is, the only three CpCs with both and an Atlantic and a Mediterranean shore, it is accepted that no Western Stock BFT was ever recorded has having been caught by any vessel flagged to one of such countries, with the exception of negligible BFT catches by Saint Pierre and Miquelon (France) and for which no auction data contained in form1 RawData records could likewise be associated to;

BFT catches pertaining to this segment and for which auction data contained in form1 RawData records was extracted, indeed correspond to Eastern Stock fish.

With all of the above in mind, the following assignments of precise geographical area of catch at sea per specimen, were made in accordance with country of origin data contained in such records, as well as with the assigned or reported fishing gear at catch per specimen, as explained in previous paragraphs. **Figure 3** summarizes used BFT catch refined geo-location format upon SCRS format requirements. for proposed form1, form2 and form3 recovered BFT independent biometric data sets for the period 1995 to 2014

With regards to "TRAP" / Set netted BFT auction records per specimen, the assignment of precise geographical area of catch at sea per specimen corresponds to the geographical location of individual tuna traps, that is:

For Moroccan tuna trapped fish ,with the exception of one tuna trap located inside the Mediterranean Sea and for which no auction data contained in form1 RawData records could be reasonably associated to, the Northeast Atlantic: **NEA;**

For Portuguese tuna trapped fish, again the Northeast Atlantic: **NEA;**

For Spanish tuna trapped fish, with the exception of one tuna trap located inside the Mediterranean Sea and for which no auction data contained in form1 RawData records could be reasonably associated to, again the Northeast Atlantic: **NEA;**

For Italian tuna traps, depending on the assigned year of catch per specimen, that is depending on whether tuna traps were operative in Western Sardinia (Western Mediterranean: MEDI W) and/or in the northern coast of Sicily (Tyrrhenian Sea: TYRR) and with the exception of one tuna trap located on the eastern shores of the Liguria Sea and for which no auction data contained in form1 RawData records could be reasonably associated to, either the Western Mediterranean Sea (MEDI W) or the Tyrrhenian Sea (TYRR). It is noted that no records attributable to Western Sardinia (Western Mediterranean: MEDI W) TRAP BFT, could be identified as such within form1 RawData records.

For Libyan tuna trapped fish, it is again to be noted that no records attributable to Libyan (Central Mediterranean: MEDI C) TRAP BFT, could be identified as such within form1 RawData records.

With regards to "FARM" / Ranched BFT auction records per specimen, the assignment of precise geographical area of catch at sea per specimen may or may not correspond to the geographical location of individual tuna ranches. Depending on the year and country of origin, a number of tuna ranches are known to have caged PS live BFT in one part of the Mediterranean Sea and towed such biomasses to other parts of the Mediterranean Sea where tuna ranches were located.

A first assignment of precise geographical areas of catch at sea per specimen, was made, based on the geographical locations of such tuna ranches:

Cyprus	(EU CYP):	MEDI E
Spain	(EU ESP):	MEDI W
Greece	(EU GRC):	MEDI C
Croatia	(EU HRV):	ADRI
Italy	(EU ITA):	TYRR & ION
Malta	(EU MLT):	MEDI C
Portugal	(EU PRT)	NEA
Tunisia	(TUN):	MEDI C
Turkey	(TUR):	MEDI E

Definitive and final assignment of precise geographical areas of catch at sea per auctioned ranched specimen:

In the case of Portugal ranched BFT, as stated in prior paragraphs, corresponds entirely to TRAP BFT catches and therefore the definitive assignment of precise geographical areas of catch at sea per specimen for such auctioned fish is:

Portugal (EU PRT) NEA

In the case of Cyprus, Greece and Tunisia ranched BFT, the assignment of precise geographical area of catch at sea per specimen, does correspond to the geographical location of such individual tuna ranches. An extensive documental search with regards to live-BFT transferred into these countries' operative tuna ranches from regions outside those of their geographical location, has proven the non existence of such occurrence.

The definitive assignment of precise geographical areas of catch at sea per specimen for such auctioned fish is therefore:

Cyprus (EU CYP): MEDI E
Greece (EU GRC): MEDI C
Tunisia (TUN): MEDI C

In the case of Croatian ranched BFT, the assignment of precise geographical area of catch at sea per specimen, may or may not correspond to the geographical location of such individual tuna ranches. An extensive documental search with regards to live-BFT transferred into these countries' operative tuna ranches from regions outside those of their geographical location, has proven the non existence of such occurrence.

For E-BFTs weighing less than 70 kgs at auction, it is assumed that such fish corresponds to catches of juvenile E-BFT practiced by the Croatian domestic PS fishing fleet inside the Adriatic Sea.

The definitive assignment of precise geographical areas of catch at sea per specimen for such auctioned fish is therefore:

Croatia (EU HRV): ADRI

For E-BFTs weighing 70 kgs and above at auction, it is assumed that such fish corresponds to catches of adult E-BFT practised by Croatian and other ICCAT CpCs PS fishing fleets outside the Adriatic Sea namely in the Central Mediterranean Sea.

The definitive assignment of precise geographical areas of catch at sea per specimen for such auctioned fish is therefore:

Croatia (EU HRV): MEDI C

In the case of Spanish ranched BFT, the assignment of precise geographical area of catch at sea per specimen, corresponds to the Western Mediterranean Sea, with the exception of years 2003 and 2004 for which a number of Spanish tuna ranches did import live-caged BFT, towed from the Central Mediterranean and Tyrrhenian Sea to the shores of Murcia, Southeast of Spain.

The definitive assignment of precise geographical areas of catch at sea per specimen for such auctioned fish is therefore:

Spain (EU ESP): MEDI W
Spain (2003-04) (EU ESP): MEDI

In the case of Italian ranched BFT, the assignment of precise geographical area of catch at sea per specimen, may or may not correspond to the geographical location of such individual tuna ranches.

Whereas tuna ranches located on the Italian Tyrrhenian shores (Northern coast of Sicily to Marina di Camerota) did not import live-caged BFT, towed from outside the Tyrrhenian Sea, and tuna ranches located in the Southern shores of Sicily or in the Ionian Sea likewise, did not import live-caged BFT, towed from outside the Central Mediterranean, auction records attributable to Italian non TYRR tuna ranches, could not be positively identified as such, within form1 RawData records.

The definitive assignment of precise geographical areas of catch at sea per specimen for such auctioned fish is therefore:

Italy (EU ITA): TYRR

In the case of Maltese ranched BFT, the assignment of precise geographical area of catch at sea per specimen, corresponds to the Central Mediterranean Sea, with the exception of year 2009, during which, one Malta-based tuna ranch operator indeed imported a negligible amount of live-caged BFT, towed from the Eastern Mediterranean. (See pictures below) It is thought that high mortality occurred during a lengthy towing period and that such biomass was frozen at harvest after its fattening season[4], therefore, never reaching Japanese Fresh (F) auction markets.

Cyprus flagged tugboat Pileas I on route to Malta, seen towing two 50m cage with live-BFT from the Eastern Mediterranean on July 26th, 2009. Pictures: Courtesy by: ATRT, sl.

Auction records attributable to such fish, could not be positively identified as such, within form1 RawData records. The definitive assignment of precise geographical areas of catch at sea per specimen for such auctioned fish is therefore:

Malta (EU MLT): MEDI C

In the case of Turkish ranched BFT, the assignment of precise geographical area of catch at sea per specimen, corresponds to the Eastern Mediterranean Sea, though in a number of unknown occasions, Turkey-based tuna ranch operators may have imported live-caged BFT, towed from the Central Mediterranean. As in the prior inverse case of Malta, it is thought that high mortality occurred during lengthy towing periods and that such

[4] Industry sources.

biomasses were frozen at harvest after fattening season, therefore, never reaching Japanese Fresh (F) auction markets[5].

Auction records attributable to such fish, could not be positively identified as such, within form1 RawData records. The definitive assignment of precise geographical areas of catch at sea per specimen for such auctioned fish is therefore:

Turkey (TUR): MEDI E

With regards to non "FARM" / Ranched (Wild) and non "TRAP" / Set netted BFT auction records per specimen, the initial assumption and assignment of precise geographical area of catch at sea per specimen corresponds, where possible, to the maritime geographical location of the flag country of origin per individual auctioned BFT record.

Such assumption/assignment is consistent with the historical locations of traditional fishing grounds of national artisanal and semi-artisanal line-based fishing fleets[6].
It is also based on the robust assumption that in order to reach the choosiest of Fresh (F) BFT market in the world: Japan, such wild-caught BFT needs to be processed and iced onboard, offloaded at port, processed, re-iced, packed and air-freighted to Japan in the shortest of time-laps possible so as preserve fish high quality and freshness throughout the marketing chain.

Fishing-ground vicinity to onshore point of export is therefore an indispensable condition in order for such Fresh (F) BFT to meet high quality standards imposed by the Japanese market.

Based on the above, a first assignment of precise geographical areas of catch at sea per specimen, was therefore made, based on historical locations of traditional fishing grounds of national artisanal and semi-artisanal line-based fishing fleets for the following countries:

Cyprus	(EU CYP):	MEDI E
Greece	(EU GRC):	MEDI E
Croatia	(EU HRV):	ADRI
Ireland	(EU IRL)	NEA
Italy (EU ITA):		MEDI C[7]
Malta	(EU MLT):	MEDI C
Portugal	(EU PRT)	NEA
Iceland	(ISL)	NEA
Israel	(ISR)	MEDI E
Libya	(LBY)	MEDI C[8]
Norway	(NOR)	NEA
Tunisia	(TUN):	MEDI C

[5] Industry sources.

[6] As stated in prior paragraphs, when auction wild-caught BFT specimens do not carry any mention as to the specific used fishing gear, the general initial assumption is that such fish may have not been purseined for the reason that wild-caught PS BFT meat quality is normally unfit for auction at high-end top quality markets such as the Japanese fresh auction fish markets.

PS Wild-caught BFT normally suffers from severe skin damage and/or of "yake", that is the browning of fish muscular-flesh tissue due to lactic acidosis phenomena as the fish is put to death inside the net, usually in summer hot seawater columns. Such fish is typically destined either for frozen (FR) production and/or for less choosier markets. The later also applies for such BFT specimens that would have incidentally been caught by either mid-water trawlers (MWT) or by harpoon fishing vessels.
Since the assumption is therefore that such BFT specimens were neither PS, TRAP or MWT wild-caught, it is safe to assume that they were caught by means of line fishing gears.

This much is further confirmed by the fact that Fresh auctioned BFT must have been caught, for self explaining reasons, no later than a maximum of seven days prior to the date of its auction in Japan. The date of auction, therefore serves as an important reference, allowing to robustly identify whether every specific specimen was or was not caught within the BFT PS summer fishing season (May to July)
In any event the assumption is that all of such fish was longlined and the assigned fishing gear for all of these fish is therefore: LL.

[7] Such an assumption and assignment is consistent with traditional Italian LL fishing vessels' historical fishing grounds inside and around the vicinity of both the Skerki Bank and the Pantelleria Shoal.

[8] As stated before, a negligible number of Libyan flagged LL fishing vessels operated in the past from the port of Las Palmas (Spain) operative both in and outside the Mediterranean Sea and for which no auction data contained in form1 RawData records could be associated to. Such Libyan flagged LL vessels are all Japanese reflagged LL fishing vessels and therefore it is safe to assume that most, if not the entirety, of their catches would be blast-frozen onboard, therefore never reaching the Japanese Fresh (F) auction markets. The assumption, therefore is that all wild BFT catches auctioned Fresh at Japanese markets could only have pertained to MEDI C catches.

Turkey (TUR): MEDI E

For countries with both NEA and MEDI shores, a second assignment of precise geographical areas of catch at sea per specimen, was made again per country and based on the following assumptions:

French auctioned Fresh (F) wild BFT

Whereas France has an NEA BFT seasonal fishery (LL and POLE) in the Gulf of Biscay. Such catches have historically been destined to the EU market, due to the small size and low-fat content of typically caught fish during such fishery. Auction records attributable to such fish (LL and POLE NE BFT), could not be positively identified as such, within form1 RawData records.

The definitive assignment of precise geographical areas of catch at sea per specimen for such auctioned fish is therefore:

France (EU FRA): MEDI W

Spanish and Moroccan auctioned Fresh (F) wild BFT

Like in the case of France, Spain also has an NEA BFT seasonal fishery (LL and POLE) in the Gulf of Biscay. Such catches also have historically been destined to the EU market, due to the small size and low-fat content of typically caught fish during such fishery. Auction records attributable to such fish (LL and POLE NE BFT), could not be positively identified as such, within form1 RawData records. Spanish LL BFT exported Fresh (F) for auction in Japan is traditionally caught in the MEDI W.

A negligible number of artisanal HAND fishing vessels flagged to Morocco and Spain, operate in the vicinity of the Strait of Gibraltar and for which the assumption is that their BFT catches are catalogued as MEDI W catches.

All in all The definitive assignment of precise geographical areas of catch at sea per specimen for such auctioned fish is therefore:

Spain (EU ESP): MEDI W
Morocco (MAR) MEDI W

*** Assumption/assignment of year of catch at sea per specimen**

Auction market daily reports contained in form1 RawData records do not contain information as to the precise year of catch per specimen having been auctioned fresh. The date of auction is the only chronological data available. The following assumptions have therefore been made both for wild or ranched specimens, since such reports either do expressly identify specimens as "FARM" (Ranched) or, as stated before, allow to robustly assume they were caught "Wild"

For Bluefin tunas identified as having been caught Wild
By definition, a wild-caught E-BFT, traded fresh any given day of any given year, is considered to have been caught at sea, less than one week prior to its day of auction.

With the exception of wild-caught E-BFT having been traded during the first six days of January of any given year, all wild-caught E-BFTs are considered as having been caught during the same year during which they were auctioned.

All wild-caught E-BFTs having been traded during the first six days of January of any given year are considered as having been caught during the immediately preceding month of the preceding year to the one in which they were auctioned.

For Bluefin tunas identified as having been Ranched

With the exception of E-BFT originating from Croatia:

Ranched E-BFTs traded during the period January 1st to June 30th of any given year were assigned as having been caught wild at sea during the immediate preceding year;

Ranched E-BFTs traded during the period July 1st to December 31st of any given year, were assigned as having been caught wild at sea during that same year.

In the case of E-BFT originating from Croatian tuna ranches:

For E-BFTs weighing less than 70 kgs at auction, it is assumed that such fish corresponds to catches of juvenile E-BFT practiced by the Croatian domestic PS fishing fleet inside the Adriatic Sea.

Such fish is normally ranched at Croatian tuna ranches for a period of two (2) to three (3) years.

It is therefore assumed that all Croatian ranched E-BFTs, weighing less than 70 kgs at sale or auction, traded during the period January 1st to December 31st of any given year, were caught wild at sea, two years prior to the year during which they were traded;

For E-BFTs weighing 70 kgs and above at auction, it is assumed that such fish corresponds to catches of adult E-BFT practised by Croatian and other ICCAT CpCs PS fishing fleets outside the Adriatic Sea namely in the Central Mediterranean Sea.

Such E-BFTs were caught at sea and transferred-live into transport cages that were then towed to Croatian tuna ranches where they were fattened and harvested in the same standard way as practiced by other Mediterranean tuna ranches. Therefore:

Croatian ranched E-BFTs weighing 70 kgs and above at auction, traded during the period January 1st to June 30th of any given year, were assigned as having been caught wild at sea during the immediate preceding year;

Croatian-ranched E-BFTs weighing 70 kgs and above, traded during the period July 1st to December 31st of any given year, were assigned as having been caught wild at sea during that same year.

For Croatian-ranched E-BFT belly-meat (BM and/or OT meat) traded fresh, it is assumed that such BM corresponds to adult E-BFT specimens caught by Croatian and other ICCAT CpCs PS fishing fleets outside the Adriatic Sea namely in the Central Mediterranean Sea.

Such E-BFTs were therefore transferred-live into transport cages that were then towed to Croatian tuna ranches where they were fattened and harvested in the same standard way as practiced by other Mediterranean tuna ranches. Therefore:

Croatian-ranched E-BFT BM traded fresh during the period January 1st to June 30th of any given year was assigned as pertaining to specimens having been caught wild at sea during the immediate preceding year;

Croatian-ranched E-BFT BM traded fresh during the period July 1st to December 31st of any given year was assigned as pertaining to specimens having been caught wild at sea during that same year.

*** Assumptions as to possible double-counting due to sequential auctioning of E-BFT specimens at different major Japanese fish auction markets**

No apparent cases of double-counting due to the sequential auctioning of a same specimen at different major Japanese fish auction markets was detected, that is, where a Fresh (F) BFT was auctioned one day at a specific market, to be re-auctioned the next day at a different market or at the same market.

Fresh (F) BFT re-auctioning practice are unknown of in the trade. The re-auctioning a day later, of a highly perishable product which has been unpacked and exhibited for over two hours on the floor at first auction, only to be then re-iced and repacked, is unlikely, not to say impossible due to sanitary and cold-chain custody and traceability. Pictures: Courtesy by: ATRT, sl.

Furthermore, it is to be noted that such re-auctioning practice of a highly perishable product (unknown of in the trade) is unlikely, not to say impossible due to sanitary traceability issues related to cold-chain custody, unpacking, re-icing & repacking, etc... (See following pictures)

<u>Other auctioned Bluefin tunas from the ICCAT management zone</u>

Data contained in such daily auction records, pertaining to Bluefin tunas for which exporting origin is Mexico, Canada, South Korea or the United States of America, was not extracted for the purpose of **form1a_dsTradeBFTfresh (F) Japan Auction Markets**, because of the following two reasons:

* Bluefin tunas originating from Mexico are all ranched specimens, thus carrying the mention "FARM". Mexico only operates tuna ranches off its North Pacific Ocean coast. Thought identified as Bluefin tunas, such specimens are to be catalogued as *Thunnus thynnus orientalis* and not as *Thunnus thynnus thynnus*.

* Industry (mainly the tuna ranching industry in the Mediterranean Sea) would export fresh large amounts of its ranched production to the United States and in negligible quantities to Canada; a small part to be marketed in the US market and the larger part to be re-exported fresh to Japan (mainly via Boston, New York, Miami and Los Angeles)

* Daily market reports do not allow to definitively identify the real geographical origin of such fish, exported fresh for auction in Japan by Canada and the United States, that is there is no way of being absolutely sure to which of both West or Eastern Stock such fish belongs to.

* The later also applies for Bluefin tuna exported fresh for auction in Japan by South Korea.

Such data was nevertheless extracted and formatted into separate suspended file **form1b_dsTradeBFTfresh (F) Japan Auction Markets (Unknown origin)**. Such data, requiring further checks, quality controls and analyses, may be crosschecked by GBYP with other trade data sources such as BCD, BSD or other trade / re-export records, in order to ascertain the true stock origin per specimen or group of specimens.

form1b_dsTradeBFTfresh (F) Japan Auction Markets and form1b_dsTradeBFTfresh (F) Japan Auction Markets (Unknown origin). structure and presentation

Extracted individual specimen data from daily auction markets is herby presented in both series, structured as follows:

1. Auction sales INFO

ID Specimen ID

Trade doc. & type (SD/RC/BCD)
Trade Doc ID
Trade Doc Type

Market details
Auction Date
Auction Market or Direct Wholesaler
Wholesaler

Quantities (n, w) & values (Yen)
Fish Num
Total Value
Fish Wgt KG
Price Per KG

Form/Shape
Product Form
Product Shape

2. Origin (producer/exporter)

Wild/Ranched BFT & year
Origin Type
Year Harvest

Exporter Nation

Wild fish catch
Gear Catch
Area Catch

3. General Remarks

Some considerations as to fattening and growth ratios of Ranched BFT having been auctioned Fresh (F) at Japanese fish auction markets

As stated in prior paragraphs, no back calculation of wild weight at catch (Ww/c) was performed, though some hints as to fattening and growth ratios are herein commented.

Fattening factors/ratios for ranched E-BFT is a controversial issue, both from an ICCAT recommendations compliance enforcement aspect as from a scientific point of view.[9]

For many years ICCAT considered a standard fattening factor of 25% (Ratio = 1,25) for ranched E-BFTs.

Studies carried out in Croatia, Greece, Malta and Spain on weight gain rates of E-BFT in Mediterranean Tuna ranches were reviewed by the SCRS in 2009.

Such studies sustained that fattening rates of E-BFT in Tuna ranches could be significantly higher than formerly believed by the scientific community.

From this discussion the door to sensibly higher fattening rates was opened (ICCAT, 2010) and a new table which showed weight gain rates based on presented information at that time was created, yet not endorsed or adopted by SCRS. See **Tables 1 and 2**.

In 2010 and 2011, two papers submitted to ICCAT SCRS[10] unequivocally contested such new fattening ratios table.

In one of such papers, fish weight at catch was back-calculated individually for a total of 8.020 E-BFT specimens fished and ranched in the Mediterranean Sea in 2008 and auctioned fresh in Japan, using such table on weight gain rates in tuna ranches.

The results obtained showed that overall 56% of the E-BFTs caught and caged in Mediterranean Sea tuna ranches and auctioned fresh in the Japanese market would have been below the 30 kgs legal minimum catch size at the start of ranching.

Undersized, illegally caught E-BFT would have amounted to 70% of the total sample in the case of Spain. The authors nevertheless, clearly warned that such results pointed to the unreliability of the new weight gain rates almost adopted back in 2009.

The unreliability of such new weight gain rates was furthermore proven beyond any reasonable doubt by using catch and harvesting weight data from Mediterranean Sea tuna ranches, extracted from the ICCAT BCD database for the years 2008, 2009, 2010 and 2011.

Based on the above, and in order to provisionally back-estimate the original weight at catch (Wild at sea)[11] the same back calculation exercise performed at SCRS/2012/126, is again herein reproduced, assuming the following cross-board fattening ratios[12]:

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[9] Reference is made to some of the most noteworthy published papers and articles prior to 2012:

- A preliminary study of the growth rate of BlueFin Tuna from Adriatic when reared in the floating cages. Ivan Katavić, Vjekoslav Tičina, Vlasta Franičević. SCRS/2001/092. Col.Vol.Sci.Pap. ICCAT, 54(2): 472-476. (2002).
- Fattening rate of BlueFin Tuna (Thunnus thynnus) in two Mediterranean fish farms. Francisca Giménez Casalduero & Pablo Sánchez-Jerez. Cybium 2006, 30(1): 51-56.
- Growth indices of small northern BlueFin Tuna (Thunnus thynnus, L.) in growth-out rearing cages. Vjekoslav Tičina, Ivan Katavić, Leon Grubišić. Elsevier-ScienceDirect, Aquaculture 269 (2007) 538–543.
- Weight growth of Atlantic BlueFin Tuna (Thunnus thynnus, L. 1758) as a result of a 6-7 months fattening process in Central Mediterranean. Tzoumas A., Ramfos A., De Metrio G., Corriero A., Spinos E., Vavassis C., and Katselis G. SCRS/2009/135.
- Estimating the fattening factor of Atlantic BlueFin Tuna (Thunnus thynnus) Tuna Farms: The Ametlla de Mar facility as a case study. Ana Gordoa. SCRS/2009/158.
- Growth performances of the BlueFin Tuna (Thunnus thynnus) ranched in the Croatian waters of Eastern Adriatic. I. Katavić, L. Grubišić, V. Tičina, K. Mišlov-Jelavić, V. Franičević and N. Skakelja. SCRS/2009/190.
- Potential growth rates in fattened/ranched Pacific BlueFin Tuna (Thunnus orientalis Temminck & Schlegel) and Southern BlueFin Tuna (Thunnus maccoyii Castelnau). Simeon Deguara, Saviour Caruana, Carmelo Agius. SCRS/2010/109.
- Some morphometric relationships in fattened BlueFin Tuna, Thunnus thynnus L., from the Turkish Aegean Sea. Fatih Percin & Okan Akyol. Journal of animal & veterinary advances 9 (11) 1684-1688, 2010.
- Size structure of the Atlantic BlueFin Tuna fished and ranched in the Mediterranean in 2003 and 2008 as revealed by the Japanese fresh market. ATRT, Greenpeace, MarViva, WWF. SCRS/2010/067.
- Results of a growth trial carried out in Malta with 190 Kg fattened Atlantic BlueFin Tuna (Thunnus thynnus L.) Simeon Deguara, Saviour Caruana, Carmelo Agius. SCRS/2010/108.

[10] Back-estimate of weight at catch of Atlantic BlueFin Tuna fished and ranched in the Mediterranean in 2008 based on data from the Japanese fresh market. ATRT, Greenpeace, MarViva, WWF. SCRS/2010/068.
Eleven years 1995-2005 of experience on growth of BlueFin Tuna (Thunnus thynnus) in farms. Txema Galaz Ugalde. SCRS/2011/160.

[11] *Accounting for the increase in weight during the various ranching periods of recorded auctioned ranched E-BFT.*

For all auctioned wild caught and harvested E-BFT, fattening ratio is: 1,00.

For auctioned ranched E-BFT, the following fattening ratios were assumed and assigned:

For E-BFTs weighing 70 kgs and above at auction, it is assumed that such fish corresponds to catches of adult E-BFT ranched during a standard 6 to 7 months fattening season. The retained cross-board fattening ratio for such fish is: 1,25 (25%)

For E-BFTs weighing less than 70 kgs at auction, with the exception of those ranched at Croatian tuna ranches, it is assumed that such fish corresponds to catches ranched during a standard 6 to 7 months fattening season. The retained cross-board fattening ratio for such fish is: 1,60 (60%)

For Croatian ranched E-BFTs weighing less than 70 kgs at auction, it is assumed that such fish corresponds to catches of juvenile E-BFT practised by the Croatian domestic PS fishing fleet inside the Adriatic Sea. Such fish is normally ranched at Croatian tuna ranches for a period of two (2) to three (3) years. The retained cross-board fattening ratio for such fish is: 2,00 (100%)

Once pertinent presentation factors[13], fattening ratios and individual year of catch (wild at sea) data have been individually assigned to each of the 150.472 E-BFT recorded E-BFT specimens for which weights were individually disclosed, we conclude that sample sizes in weight amount to 16.020.701,18 kgs (weight at auction).

Such volume is equivalent to 15.881.054,93 kgs (Wild round weight at catch – W/rW), worth 6,13% of total catches by previously listed ICCAT CpCs on the East Atlantic BFT stock, officially reported and recorded to and by ICCAT; the yearly detail of which can be seen in **Table 3**.

As of 2002, purse seine catches from aggregations of E-BFT spawners in the Mediterranean were massively transferred-live and ranched throughout the region prior to being exported to the main market in Japan. Information summarized in **Table 4**, describing the 150.472 auctioned recorded E-BFT specimens per country of origin and wild/ranched status, confirms that ranching covered most Mediterranean areas during the 2002 to 2012 period.

1

2

3

[12] Whatever the fattening rate considered, the combined sequential use of two conversion factors yields in all cases a lower value for the estimated wild round weight (W/rW) of fish, than for the weight of raw fish from the auction market, particularly for smaller, faster-growing fish. The higher the fattening rate or ratio, the smaller the W/rW of fish will be.

[13] E-BFTs auctioned fresh below 70 kgs are usually auctioned gilled and gutted (GG) whereas those over 70 kgs are typically auctioned dressed (DR). (See following pictures 1 to 12) 1.16 and 1.25 conversion factors to round weight were thus applied respectively

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Spanish ranched E-BFTs over 70 kgs auctioned fresh at Tokyo's Tsukiji Fish Market on February 16th 2012. Dressed (DR) weights for each fish are indicated in individual fish label close-up photographs. Pictures Courtesy by RMB®.

This suggests that data presented in this paper accurately accounts spatiotemporally for E-BFT captured in the main spawning areas within the Mediterranean Sea and discards the possibility of any potential major geographical bias between years.

Furthermore, a yearly comparison of number (N) of sampled fish corresponding to E-BFTs caught and/or ranched by previously indicated ICCAT CpCs[14], between ICCAT SCRS Task II biometric database and the set of records presented in this paper clearly shows that the latter is, for most of the years, quantitatively and qualitatively more robust, as shown in **Table 5.**

[14] *Croatia, Cyprus, France, Greece, Iceland, Italy, Libya, Malta, Morocco, Norway, Portugal, Spain, Tunisia and Turkey*

Finally and in order to compare the size structure of all 150.472 recorded E-BFT specimen, auctioned fresh in the Japanese markets and for which information on weight was available (that is individually disclosed in such daily market reports), size frequencies for each year, starting 2002, were plotted in 10-kgs size classes.

Fish below 10 kgs at catch, were included in a first 5 kgs ≤ W > 20 kgs weight segment.

The frequency distribution of sizes grouped into 10-kgs size (=weight) classes for the years 2002 through 2012 fishing years is displayed in **Figures 4 to 25.**

The results of the 11 years taken together clearly show a distribution of sizes into two clear distinct size groupings cantered, respectively, on the 30-60 kgs size class and the 150-250 kgs size classes.

-. form2- BFT (Thunnus thynnus) production per specimen Live (L), Fresh (F) & Frozen (FR) product (Source: Corporate records)

Individual and/or grouped information from 1995 to 2008, for a total of 615.994 fish, was obtained from the following BFT fishing and/or ranching operators' corporate and/or trade records as well as fishing vessels logbooks and sampling programmes, excluding ICCAT trade or CoC records related to them:

* Dardanel	* AdriaticTuna	* Fish & Fish
* Ecolofish	* AJD Tuna	* Isola Piana
* FFWG	* Ak-Tuna	* Jadran Tuna
* Ginés Méndez España,	* Akua Kocaman	* Kali Tuna
* Grupo Antalba,	* Akua-Dem	* Malta Fish Farms
* Grupo Fuentes,	* Akua-Italia	* Marituna
* Mitsubishi Corp,	* Balfegó Grup	* Pescazzurra
* Nature Pesca,	* Basaranlar	* Sagun Group
* Opp51,	* Bluefin tuna Hellas	* San Francesco di Paola
* PisciAlba	* Consorzio	* Sardina
* Ta'Mattew Fish Farms	* TFT	* VMT

As shown in **Figure 1**, recovered data amounts to a robust biometric outlook of MEDI ranched Bluefin tunas produced during such period, thus filling in an important data-gap available in the Bluefin tuna data content stored inside ICCAT database information system.

As shown in **Figure. 2**, this series was subsequently subdivided in two (2) subseries:

* **form2a- BFT (Thunnus thynnus) production per specimen Live (L), Fresh (F) & Frozen (FR) product (Source Corporate records) pertaining to wild caught BFT**

* **form2b- BFT (Thunnus thynnus) production per specimen Live (L), Fresh (F) & Frozen (FR) product (Source Corporate records) pertaining to ranched BFT**

Raw data (accounting for over 1.200 files), that is copy of all of such corporate records such as and among others:

* Internal company catch and/or live-transfer reports,
* Fishing vessels logbooks,
* Vessel/Tuna Ranch caging declarations,
* Internal company biomass (Ns and Weight) evaluation reports per moored cage,

* Internal company reports of morts during towing and/or ranching/fattening,
* Internal company reports on bait, nutrition, fat content analysis, etc...
* Internal company harvesting, incidences, packing blast-freezing and reefer onboard loading reports,
* Fresh and/or Frozen BFT product invoices,
* Karakulak 2003 to 2005 MEDI E BFT sampling reports

can be found in annexed folder: **form2 RawData**. Such collection of records was recovered by the author of this report, for WWF and Greenpeace back in 2010. Both organizations have authorized the author of this report to forward such collection for the purpose of this report, as well as to extract and adequately format all pertinent biometric data therein contained to SCRS format requirements.

Contrary to **form1a_dsTradeBFTfresh (F) Japan Auction Markets,** no complementary data assumptions/assignments for individual E-BFT catch, sampling or trade records contained in both **form2a- BFT (Thunnus thynnus) production per specimen Live (L), Fresh (F) & Frozen (FR) product (Source Corporate records) pertaining to wild caught BFT** or **form2b- BFT (Thunnus thynnus) production per specimen Live (L), Fresh (F) & Frozen (FR) product (Source Corporate records) pertaining to ranched BFT**, were needed, as such data[15] was indeed expressly disclosed in form2 RawData records.

form2a- BFT (Thunnus thynnus) production per specimen Live (L), Fresh (F) & Frozen (FR) product (Source Corporate records) pertaining to wild caught BFT and **form2b- BFT (Thunnus thynnus) production per specimen Live (L), Fresh (F) & Frozen (FR) product (Source Corporate records) pertaining to ranched BFT**, **structure and presentation**

Extracted individual and/or grouped specimen data from form2 RawData records, is herby presented in both series, structured as follows:

1. Fish info

ID Specimen ID

Trade doc. & type (SD/RC/BCD)
- Reported ICCAT Catch Ref. Nº, standardised Stat Doc Nº or BCD number at catch or at harvest
- Trade Doc Type

Catch / live-transfer / harvest details
- Year of Catch
- Fishing Vessel or Trap Name
- Fishing Vessel, or Trap Nationality
- Where applicable name of Tuna Ranch of final destination of transferred live-BFT
- Tuna Ranch Cage Id
- BFT Producer or Tuna Ranch Nationality
- Date of catch
- If ranched, date of harvest
- Fishing Area Code
- Fishing Gear Group
- Latitude
- Longitude
- Fish catch / live-transfer status

Quantities (n, w, fl) & sex
- Number of fish
- Weight (Kg)
- Average weight (Kg)
- Reported RD Weight range of fish
- Fork Length (Cms)
- Sex

[15] *Presentation at catch, sampling or trade per individual or grouped specimens; wild/ranched nature and catch fishing gear per individual or grouped specimens; geographical area of catch at sea per individual or grouped specimens; year of catch at sea per individual or grouped specimens.*

Form/Shape

Live (L), Fresh (F) or Frozen (FR) Presentation

2. Marketing data

- Wild or Ranched
- End Market
- End buyer
- Price per Kg (¥, Pts, US$, £ or €)
- Date of sale

3. General

Source of Data
Remarks

Live - harvested BFT double counting issues within form2b- BFT (Thunnus thynnus) production per specimen Live (L), Fresh (F) & Frozen (FR) product (Source Corporate records) pertaining to ranched BFT

Whereas such double counting issues are inexistent in form2a- BFT (Thunnus thynnus) production per specimen Live (L), Fresh (F) & Frozen (FR) product (Source Corporate records) pertaining to wild caught BFT, form2b, pertaining to ranched BFT, indeed contains precise biometric data records of live transferred BFT (L) and biometric data records for that same fish at harvest, after fattening season.

All records are clearly identified, namely as to "Fish catch / live-transfer status", and the spreadsheet format allows both to select or deselect either only (L) fish, (F) and/or (FR) fish, in avoidance of any double counting cases.

Double counting issues between form1a_dsTradeBFTfresh (F) Japan Auction Markets, form2a- BFT (Thunnus thynnus) production per specimen Live (L), Fresh (F) & Frozen (FR) product (Source Corporate records) pertaining to wild caught BFT and form2b- BFT (Thunnus thynnus) production per specimen Live (L), Fresh (F) & Frozen (FR) product (Source Corporate records) pertaining to ranched BFT,

Whereas the issue of double counting may not be raised between auctioned Fresh(F) E-BFT and traded Frozen (FR) E-BFT, a crosscheck between individual Fresh (F) harvested/auctioned/traded E-BFT records, for which complete data pertaining to Origin Type, Year Harvest, Exporter Nation, Area Catch, Gear Catch, Product Shape, Fish Wgt KG, Harvest or trade Date and/or Auction Date was available in both form1a-BFT and form2(a&b)-BFT; was performed on a case by case basis, only to corroborate, that no specific double counting cases for all of such fish could be detected.

Crosscheck was carried-out by comparing the following data per record and in the presented order:

form2(a&b)-BFT		**form1a-BFT**
Origin Type	→ = or ≠ →	Origin Type
Year Harvest	→ = or ≠ →	Year Harvest
Exporter Nation	→ = or ≠ →	Exporter Nation
Area Catch	→ = or ≠ →	Area Catch
Gear Catch	→ = or ≠ →	Gear Catch
Product Shape (*1*)	→ = or ≠ →	Product Shape
Fish Wgt KG	→ = or ≠ →	Fish Wgt KG
Harvest or trade Date (*2*)	→ ≈ or ≠ →	Auction Date

(1) The general assumption being that once the (F) E-BFT having been processed (GG, DR or BM) at origin, the product shape at destination remains the same.

(2) Harvest or trade date never being the same as the actual auction date for an individual specific (F) E-BFT, the crosscheck exercise focused on harvest or trade dates, six days maximum, prior to auction dates.

Such result does not necessarily mean that the entirety of form1(a)-BFT and form2(a&b)-BFT are perfectly complementary.

● A substantial number of records pertaining to Fresh (F) traded E-BFT (717 records contained in form2(a) out of a total of 1.259 and 984 records contained in form2(b) out of a total of 65.784) are characterized by the following individual specific data description:

Number of fish	> 1
and/or	
Weight (Kg)	Not available
and/or	
Reported RD Weight range of fish	Available
and/or	
Fork Length (Cms)	Available

●● Furthermore, another substantial number of records pertaining to Fresh (F) traded E-BFT contained in form2(a&b)-EBFT, just relate to harvest information. Product Shape of such fish is therefore Round (RD) at harvest thus not fully corresponding to Product Shape at auction. In this case, ICCAT standard Product Shape conversion factors are not to be considered as a precise conversion tool for crosscheck purposes.

The direct assumption for all of such records (● & ●●) is that, while there is no other way to crosscheck them with records contained in form1-BFT by means of so-far unavailable traceable trade references such as BCD, SD or other, some of individual specimen auction records contained in form1(a)-BFT, may well correspond to Fresh (F) records contained in form2(a&b)-BFT.

-. form3- BFT (Thunnus thynnus) production per specimen Live (L) & Fresh (F) product (Source ICCAT records)

Individual and/or grouped information from 2004 to 2014, for a total of 2.219.910 fish, was obtained, extracted and formatted into a separate suspended file, from the following ICCAT trade or CoC records:

* ICCAT Bi-Annual BFT Statistical Reports (2004-2011)

* ICCAT CoC Reports (2007-2008)

* ICCAT BCD Database (2008-2014)

As shown in **Figure 1**, and as for the case of form2, recovered data amounts to a robust biometric outlook of MEDI wild-caught and ranched Bluefin tunas produced during such period, thus again filling an important data-gap in ICCAT BFT database.

ICCAT Bi-Annual BFT Statistical Reports (2004-2011) and ICCAT CoC Reports (2007-2008) were obtained in the public domain.

ICCAT BCD Database data was obtained from a confidential source.

The SCRS is therefore reminded that caution is advised while handling such data in avoidance of data custody losses that could compromise the confidentiality of commercial information therein contained.

Since ICCAT BCD Database is a dynamic database constantly being updated, herein proposed data (Extracted on January and March 2014) is to be considered as a provisional data extraction snapshot.

Such biometric data, is annexed to this report as a separate suspended file.

It is therefore suggested that the SCRS crosschecks such data with the ICCAT Secretariat in order to validate the information available to the SCRS.

As in the case of form2 and as shown in **Figure 2**, this series was also subsequently subdivided in two (2) subseries:

* **form3a- BFT (Thunnus thynnus) production per specimen Live (L) & Fresh (F) product (Source ICCAT records) pertaining to wild caught BFT**

* **form3b- BFT (Thunnus thynnus) production per specimen Live (L) & Fresh (F) product (Source ICCAT records) pertaining to ranched BFT**

Raw data, that is copy of all of such ICCAT records, can be found in annexed folder: **form3 RawData**.

As in the case of **form2a- BFT (Thunnus thynnus) production per specimen Live (L), Fresh (F) & Frozen (FR) product (Source Corporate records) pertaining to wild caught BFT** and **form2b- BFT (Thunnus thynnus) production per specimen Live (L), Fresh (F) & Frozen (FR) product (Source Corporate records) pertaining to ranched BFT**,.**form3a- BFT (Thunnus thynnus) production per specimen Live (L) & Fresh (F) product (Source ICCAT records) pertaining to wild caught BFT** and **form3b- BFT (Thunnus thynnus) production per specimen Live (L) & Fresh (F) product (Source ICCAT records) pertaining to ranched BFT**, are structured and presented as follows:

Extracted individual and/or grouped specimen data from form3 RawData records and BCD Database, is herby presented in both series, structured as follows:

1. Fish info

ID Specimen ID

Trade doc. & type (SD/RC/BCD)
Reported ICCAT Catch Ref. Nº, standardised Stat Doc Nº or BCD number at catch or at harvest
Trade Doc Type

Catch / live-transfer / harvest details
Year of Catch
Fishing Vessel or Trap Name
Fishing Vessel, or Trap Nationality
Where applicable name of Tuna Ranch of final destination of transferred live-BFT
Tuna Ranch Cage Id
BFT Producer or Tuna Ranch Nationality
Date of catch
If ranched, date of harvest
Fishing Area Code
Fishing Gear Group
Latitude
Longitude
Fish catch / live-transfer status

Quantities (n, w, fl) & sex
Number of fish
Weight (Kg)
Average weight (Kg)
Reported RD Weight range of fish
Fork Length (Cms)
Sex

Form/Shape

Live (L), Fresh (F) or Frozen (FR) Presentation

2. Marketing data

Wild or Ranched
End Market
End buyer
Price per Kg (¥, Pts, US$, £ or €)
Date of sale

3. General

Source of Data
Remarks

Live - harvested BFT double counting issues within form3b- BFT (Thunnus thynnus) production per specimen Live (L) & Fresh (F) product (Source ICCAT records) pertaining to ranched BFT

Whereas such double counting issues are inexistent in **form3a- BFT (Thunnus thynnus) production per specimen Live (L) & Fresh (F) product (Source ICCAT records) pertaining to wild caught BFT**, **form3b- BFT (Thunnus thynnus) production per specimen Live (L) & Fresh (F) product (Source ICCAT records) pertaining to ranched BFT**, indeed contains precise biometric data records of live transferred BFT (L) and biometric data records for that same fish at harvest, after fattening season.

All records are clearly identified, namely as to "Fish catch / live-transfer status", and the spreadsheet format allows both to select or deselect either only (L) fish, (F) and/or (FR) fish, in avoidance of any double counting cases.

With regards to BCD extracted records, it is to be noted that for all of such fish, recorded weight corresponds to Round (RD) weight at catch or harvest, not processed weight at trade Gilled&gutted (GG), Dressed (DR), Loined (L), Filletted (FL) or others such as BM and/or OT.
Though such important information per record is indeed contained in the BCD database, the decision was made not to extract such data, due to the confidentiality nature of sensitive commercial information therein contained but unavailable to the public at large and thus calling for SCRS-GBYP to obtain from ICCAT Secretariat, authorization to access such data.

Once such data is accessed, duly extracted and added to **form3a- BFT (Thunnus thynnus) production per specimen Live (L) & Fresh (F) product (Source ICCAT records) pertaining to wild caught BFT** and **form3b- BFT (Thunnus thynnus) production per specimen Live (L) & Fresh (F) product (Source ICCAT records) pertaining to ranched BFT**, SCRS-GBYP may proceed to crosscheck such data with that contained in other biometric series.

Notwithstanding, the author of this report wishes to raise particular concerns as to the unreliability of growth/fattening ratios/factors that could be derived from comparing ranched E-BFT weight BCD data at harvest from that at live-transfer.

BCD reported data pertaining to weight at catch and weight at harvest, indeed suggests that many fattening ratios that could be derived from such figures, cannot be explained biologically. This much was already pointed out by Tudela et al. (SCRS/2013/208): "*The high fattening ratios (extreme in some cases), the independence of the ratios from the starting fish size and the fattening time and the big discrepancies arisen from BCDs from different nations but covering a same batch of fish suggest potential measuring or reporting errors*".

Whereas BCD recorded weights at live-transfer, are likely to be underreported, BCD reported weights at harvest of such ranched fish after fattening, need to be as accurate as possible because of trade & customs traceability paper-trail necessities.

3. Discussion

Three sets of biometric data, are presented in this report as separate suspended files. These are:

form1b_dsTradeBFTfresh (F) Japan Auction Markets and form1b_dsTradeBFTfresh (F) Japan Auction Markets (Unknown origin).

form3a- BFT (Thunnus thynnus) production per specimen Live (L) & Fresh (F) product (Source ICCAT records) pertaining to wild caught BFT

form3b- BFT (Thunnus thynnus) production per specimen Live (L) & Fresh (F) product (Source ICCAT records) pertaining to ranched BFT

The reasons for their separate suspended file status has been explained at length.

Three other sets of biometric data, presented herein, are to be considered as having gone through full verification, crosscheck and validation processes. These are:

form1a_dsTradeBFTfresh (F) Japan Auction Markets

form2a- BFT (Thunnus thynnus) production per specimen Live (L), Fresh (F) & Frozen (FR) product (Source Corporate records) pertaining to wild caught BFT

form2b- BFT (Thunnus thynnus) production per specimen Live (L), Fresh (F) & Frozen (FR) product (Source Corporate records) pertaining to ranched BFT

Though such three series are not fully complementary because of possible issues of double counting among data pertaining to Fresh (F) traded/auctioned E-BFT, it is suggested that such phenomena is likely to be residual, thus allowing a combination of all such data in order to provisionally quantify its coverage significance in terms of percentage, when alternatively compared to 1998-2011:

Yearly effective Total adjusted ICCAT NEA+MED BFT Yearly Quotas in Kgs[16].

Yearly total NEA + MED BFT Catches in Kgs[17].

Yearly traded estimated equivalent W/rW in Kgs (Low - Carryovers not included)[18]

Yearly traded estimated equivalent W/rW in Kgs (High - Carryovers not included)[19]

Yearly traded estimated equivalent W/rW in Kgs (Low - Carryovers included)[20]

and

Yearly traded estimated equivalent W/rW in Kgs (High - Carryovers included)[21]

Such provisional quantification of coverage significance in terms of percentage is presented in **Figure 26.**

Years 2001 to 2007 included correspond to higher coverage significance levels, with coverage percentages ranging from a lower 7,99% in 2007 to a higher 22,24% in 2006.

[16] Source: ICCAT
[17] Source: ICCAT Task I (2008 to 2011 Figures ICCAT Monthly Catch Reports)
[18] Source: SCRS 2012 127 Mielgo Bregazzi R
[19] Source: SCRS 2012 127 Mielgo Bregazzi R
[20] Source: SCRS 2012 127 Mielgo Bregazzi R
[21] Source: SCRS 2012 127 Mielgo Bregazzi R

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This work was carried out under the provision of the ICCAT Atlantic Wide Research Programme for Bluefin Tuna (GBYP), funded by the European Union, by several ICCAT CPCs, the ICCAT Secretariat and by other entities (see: http://www.iccat.int/GBYP/en/Budget.htm).

Tables 1 and 2. New ranched E-BFT fattening rates table, created by SCRS in 2009/2010, which showed significant higher weight gain rates, based on information presented to SCRS at that time.

% Increase in weight of BFT over initial caged weight														
START AGE	START FL	June START	Jul 1	Aug 2	Sep 3	Oct 4	Nov 5	Dec 6	Jan 7	Feb 8	Mar 9	Apr 10	May 11	Jun 12
1	55	4	27	63	99	135	162	180	191	202	213	224	240	256
2	77	9	17	40	63	85	103	114	125	135	146	156	172	188
3	97	17	13	29	46	63	76	84	94	104	115	125	140	155
4	116	29	12	27	43	59	70	78	88	98	109	120	131	142
5	133	42	11	25	40	54	65	72	81	90	99	108	122	136
6	148	56	10	23	36	50	59	66	74	83	91	100	112	124
7	162	72	9	22	35	47	57	63	71	78	86	93	105	117
8	176	90	9	21	33	45	54	60	67	73	80	87	97	107
9	187	106	9	20	31	43	51	57	63	69	76	82	91	100
10	198	124	8	19	30	41	49	54	59	65	70	76	84	92
11	208	142	8	19	29	40	48	53	58	62	67	71	78	85
12	217	160	8	18	29	39	47	52	56	60	63	67	73	79
13	226	179	8	18	28	38	46	51	54	57	60	63	67	71
14	233	195	8	18	28	38	45	50	52	55	57	59	63	67
15	240	211	7	17	27	37	44	49	51	52	54	55	58	61
16	247	228	7	17	26	36	43	48	49	50	51	52	53	54
17	252	241	7	16	26	35	42	47	47	48	48	49	49	50
18	258	258	7	16	25	35	41	46	46	47	47	47	48	48
19	262	269	8	16	25	34	41	45	45	46	46	46	47	47
20	267	283	7	15	24	33	40	44	44	45	45	45	46	46
21	271	295	6	15	24	32	39	43	43	44	44	44	45	45
22	275	307	6	15	23	32	38	42	42	43	43	43	44	44
23	278	316	6	14	23	31	37	41	41	42	42	42	43	43
24	281	326	6	14	22	30	36	40	40	41	41	41	42	42
25	284	335	6	14	21	29	35	39	39	40	40	40	41	41
Expected RWT of BFT														
START AGE	START FL	June START	Jul 1	Aug 2	Sep 3	Oct 4	Nov 5	Dec 6	Jan 7	Feb 8	Mar 9	Apr 10	May 11	Jun 12
1	55	4	5	6	7	9	10	10	11	11	11	12	12	13
2	77	9	11	13	15	17	19	20	21	22	23	24	25	27
3	97	17	20	23	25	28	31	32	34	36	38	39	42	44
4	116	29	32	36	41	45	49	51	54	57	60	63	66	69
5	133	42	46	52	58	64	69	72	75	79	83	86	92	98

6	148	56	61	69	76	84	89	93	97	102	107	112	118	125
7	162	72	78	87	97	105	112	117	122	127	133	138	147	155
8	176	90	98	109	120	130	138	144	150	155	162	168	177	186
9	187	106	116	127	139	152	160	167	173	179	187	193	203	212
10	198	124	134	148	162	175	185	191	198	205	211	219	229	239
11	208	142	154	169	184	199	211	218	225	231	238	243	253	263
12	217	160	173	189	206	222	235	243	250	256	261	267	277	286
13	226	179	193	211	229	247	261	270	275	281	286	292	299	306
14	233	195	210	230	249	268	282	292	296	302	305	309	317	325
15	240	211	226	247	268	289	304	314	319	321	325	327	333	340
16	247	228	244	267	288	311	327	338	340	343	345	347	349	352
17	252	241	258	280	304	326	343	355	355	357	357	360	360	362
18	258	258	276	299	322	348	363	376	376	379	379	379	381	381
19	262	269	290	312	336	360	379	390	390	392	392	392	395	395
20	267	283	303	325	351	376	396	408	408	410	410	410	413	413
21	271	295	313	339	366	389	410	422	422	425	425	425	427	427
22	275	307	325	353	378	405	424	436	436	439	439	439	442	442
23	278	316	335	361	389	414	433	446	446	449	449	449	452	452
24	281	326	345	371	397	423	443	456	456	459	459	459	463	463
25	284	335	356	382	406	433	453	466	466	470	470	470	473	473

Table 3. Yearly detail of auctioned E-BFT sample sizes in weight for which information on weight at auction was individually disclosed in recorded daily market reports, expressed as a percentage of yearly total E-BFT catches by concerned ICCAT CPCs.

Assigned year of catch (Wild at sea)	Year of auction	Weight at auction	Equivalent auctioned W/rW	N by assigned year of catch (Wild at sea)	Total Weight at auction	Total equivalent auctioned W/rW	Total reported E-BFT catches by ICCAT CpCs	Percentage
2001	2002	767.758,70	741.607,80	6.039	780.168,17	746.406,13	28.625.310,00	**2,61%**
	2003	12.409,47	4.798,33					
2002	2002	431.349,23	520.700,87	14.636	1.281.190,73	1.316.516,09	27.919.510,00	**4,72%**
	2003	831.485,20	788.717,45					
	2004	18.356,30	7.097,77					
2003	2003	2.109.280,70	2.176.443,50	30.348	3.616.030,70	3.621.883,11	25.491.810,00	**14,21%**
	2004	1.506.384,10	1.445.298,13					
	2005	365,90	141,48					
2004	2004	1.571.571,15	1.609.652,22	21.601	2.536.372,25	2.534.772,76	26.015.520,00	**9,74%**
	2005	961.053,80	923.671,58					
	2006	3.747,30	1.448,96					
2005	2005	1.521.911,83	1.557.989,47	21.448	2.695.735,83	2.689.501,95	29.893.740,00	**9,00%**
	2006	1.167.020,80	1.128.881,91					
	2007	6.803,20	2.630,57					
2006	2006	853.158,60	890.445,61	15.015	1.526.112,70	1.526.355,87	27.121.350,00	**5,63%**
	2007	672.351,50	635.677,25					
	2008	602,60	233,01					
2007	2007	548.022,30	577.910,89	8.398	823.750,90	827.073,91	30.529.390,00	**2,71%**
	2008	274.702,40	248.766,22					
	2009	1.026,20	396,80					
2008	2008	287.042,60	307.840,74	11.402	767.868,20	721.476,46	19.613.410,00	**3,68%**
	2009	473.267,20	410.713,14					
	2010	7.558,40	2.922,58					
2009	2009	726.940,30	689.104,08	13.801	1.278.325,00	1.204.990,90	17.634.500,00	**6,83%**
	2010	551.384,70	515.886,82					
2010	2010	180.165,80	175.150,18	3.343	345.151,70	324.043,29	10.101.020,00	**3,21%**
	2011	164.796,50	148.819,88					
	2012	189,40	73,23					
2011	2011	155.780,50	140.388,12	3.398	282.020,20	260.281,92	8.662.800,00	**3,00%**
	2012	126.239,70	119.893,80					
2012	2012	87.912,20	107.728,36	1.041	87.912,20	107.728,36	7.377.920,00	**1,46%**

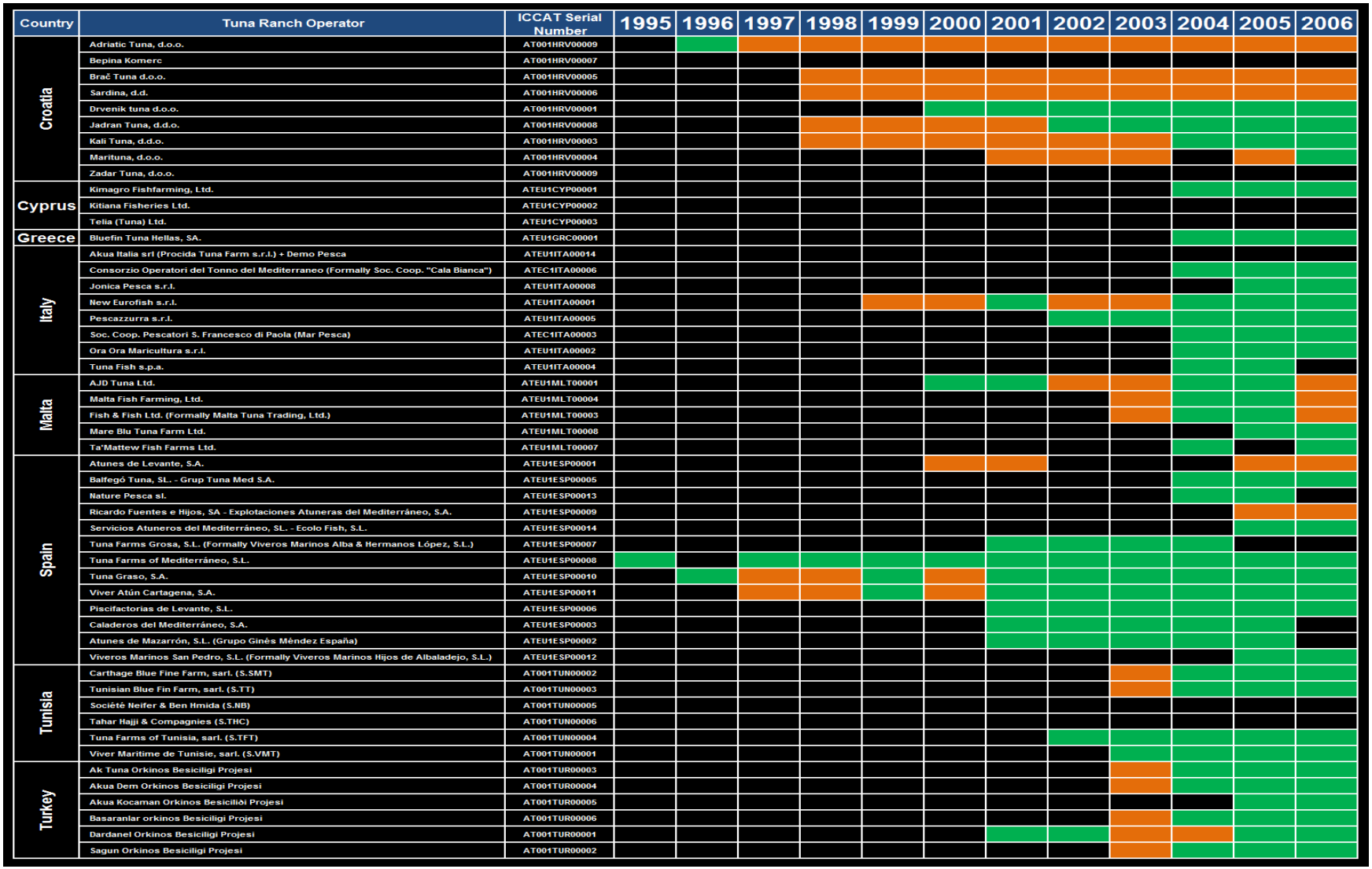
Table 4. Description of the 150.472 auctioned recorded E-BFT specimens per country of origin and wild/ranched status

BFT Producer or Tuna Ranch Nationality	Wild or Ranched	Auctioned E-BFT N by assigned year of catch (Wild at sea)												
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Croatia	Ranched	2	262	417	846	92	1.238	596	146	199	33	33	1	
	Wild			6	60	66	54	28	2			4		
Cyprus	Ranched				15									
	Wild													6
France	Ranched													
	Wild			332	71	24	75							
Greece	Ranched				78					58	166	47	34	
	Wild			321	738	359	221	98	105	542	52		50	669
Iceland	Ranched													
	Wild				2	3	17							
Ireland	Ranched													
	Wild			1										
Israel	Ranched													
	Wild			1										
Italy	Ranched				1.303	1.167	2.187	1.114	208	675	308			
	Wild			1.707	1.202	959	712	665	78	55	149	24	216	3
Libya	Ranched													
	Wild			48	2			2						
Malta	Ranched			132	2.606	631	381	403	53	492	3.247	173	72	
	Wild			25		351	132	7		31	253	9	1	311
Morocco	Ranched													
	Wild				2		19	77	200	48	44			
Norway	Ranched													
	Wild					5								
Portugal	Ranched										99	107	147	
	Wild			20	26	8							3	31
Spain	Ranched		5.777	6.461	14.194	9.619	11.243	8.501	5.161	3.533	4.100	2.487	2.747	
	Wild			1.271	1.453	1.011	672	676	919	314	73			
Tunisia	Ranched			7	981	315	393	48	12	605	1.241			
	Wild			2.169	760	800	1.287	1.271	519	2.206	59			
Turkey	Ranched			1.142	5.513	5.842	2.680	1.297	856	2.619	3.977	459	119	
	Wild			576	496	349	137	232	139	25			8	21

Table 5. Yearly comparison of number (N) of sampled fish corresponding to E-BFTs caught and/or ranched by previously indicated ICCAT CpCs[22], between ICCAT SCRS Task II biometric database and those contained in the set of Japan fish auction market daily records. As shown in **Table 5,** sample size of Task II records for 2000-2012 is similar to that of records gathered in this study from the Japanese fish auction market for the same period. However, it should be noted that substantial qualitative differences exist among both data-sets. While Task II data is partly based on guesstimates of average size of fish reported by fishermen in logbooks that are then extrapolated to the entire catch, our database fully relies on individual records resulting in most cases in an accurate weight determination of single specimens.

	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Auctioned E-BFT N by assigned year of catch (Wild at sea)	2	6.039	14.636	30.348	21.601	21.448	15.015	8.398	11.402	13.801	3.343	3.398	1.041
N by assigned year of catch (Wild at sea) According to ICCAT SCRS Task II	18.687	16.946	15.203	20.042	14.375	10.739	9.404	9.685	14.077	11.315	n/a	n/a	n/a

[22] Croatia, Cyprus, France, Greece, Iceland, Italy, Libya, Malta, Morocco, Norway, Portugal, Spain, Tunisia and Turkey



Country	Tuna Ranch Operator	ICCAT Serial Number	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Croatia	Adriatic Tuna, d.o.o.	AT001HRV00009												
	Bepina Komerc	AT001HRV00007												
	Brač Tuna d.o.o.	AT001HRV00005												
	Sardina, d.d.	AT001HRV00006												
	Drvenik tuna d.o.o.	AT001HRV00001												
	Jadran Tuna, d.d.o.	AT001HRV00008												
	Kali Tuna, d.d.o.	AT001HRV00003												
	Marituna, d.o.o.	AT001HRV00004												
	Zadar Tuna, d.o.o.	AT001HRV00009												
Cyprus	Kimagro Fishfarming, Ltd.	ATEU1CYP00001												
	Kitiana Fisheries Ltd.	ATEU1CYP00002												
	Telia (Tuna) Ltd.	ATEU1CYP00003												
Greece	Bluefin Tuna Hellas, SA.	ATEU1GRC00001												
Italy	Akua Italia srl (Procida Tuna Farm s.r.l.) + Demo Pesca	ATEU1ITA00014												
	Consorzio Operatori del Tonno del Mediterraneo (Formally Soc. Coop. "Cala Bianca")	ATEC1ITA00006												
	Jonica Pesca s.r.l.	ATEU1ITA00008												
	New Eurofish s.r.l.	ATEU1ITA00001												
	Pescazzurra s.r.l.	ATEU1ITA00005												
	Soc. Coop. Pescatori S. Francesco di Paola (Mar Pesca)	ATEC1ITA00003												
	Ora Ora Maricultura s.r.l.	ATEU1ITA00002												
	Tuna Fish s.p.a.	ATEU1ITA00004												
Malta	AJD Tuna Ltd.	ATEU1MLT00001												
	Malta Fish Farming, Ltd.	ATEU1MLT00004												
	Fish & Fish Ltd. (Formally Malta Tuna Trading, Ltd.)	ATEU1MLT00003												
	Mare Blu Tuna Farm Ltd.	ATEU1MLT00008												
	Ta'Mattew Fish Farms Ltd.	ATEU1MLT00007												
Spain	Atunes de Levante, S.A.	ATEU1ESP00001												
	Balfegó Tuna, SL. - Grup Tuna Med S.A.	ATEU1ESP00005												
	Nature Pesca sl.	ATEU1ESP00013												
	Ricardo Fuentes e Hijos, SA - Explotaciones Atuneras del Mediterráneo, S.A.	ATEU1ESP00009												
	Servicios Atuneros del Mediterráneo, SL. - Ecolo Fish, S.L.	ATEU1ESP00014												
	Tuna Farms Grosa, S.L. (Formally Viveros Marinos Alba & Hermanos López, S.L.)	ATEU1ESP00007												
	Tuna Farms of Mediterráneo, S.L.	ATEU1ESP00008												
	Tuna Graso, S.A.	ATEU1ESP00010												
	Viver Atún Cartagena, S.A.	ATEU1ESP00011												
	Piscifactorias de Levante, S.L.	ATEU1ESP00006												
	Caladeros del Mediterráneo, S.A.	ATEU1ESP00003												
	Atunes de Mazarrón, S.L. (Grupo Ginés Méndez España)	ATEU1ESP00002												
	Viveros Marinos San Pedro, S.L. (Formally Viveros Marinos Hijos de Albaladejo, S.L.)	ATEU1ESP00012												
Tunisia	Carthage Blue Fine Farm, sarl. (S.SMT)	AT001TUN00002												
	Tunisian Blue Fin Farm, sarl. (S.TT)	AT001TUN00003												
	Société Neifer & Ben Hmida (S.NB)	AT001TUN00005												
	Tahar Hajji & Compagnies (S.THC)	AT001TUN00006												
	Tuna Farms of Tunisia, sarl. (S.TFT)	AT001TUN00004												
	Viver Maritime de Tunisie, sarl. (S.VMT)	AT001TUN00001												
Turkey	Ak Tuna Orkinos Besiciligi Projesi	AT001TUR00003												
	Akua Dem Orkinos Besiciligi Projesi	AT001TUR00004												
	Akua Kocaman Orkinos Besiciliði Projesi	AT001TUR00005												
	Basaranlar orkinos Besiciligi Projesi	AT001TUR00006												
	Dardanel Orkinos Besiciligi Projesi	AT001TUR00001												
	Sagun Orkinos Besiciligi Projesi	AT001TUR00002												

Figure 1. Form2 recovered corporate BFT biometric data for the period 1995 to 2006, by tuna Ranch, country and year. Coloured cells correspond to operative tuna ranches for a particular year. Orange coloured cells correspond to tuna Ranches for which biometric data was not acquired or recovered. Green cells correspond to tuna Ranches for which biometric data was recovered and formatted.

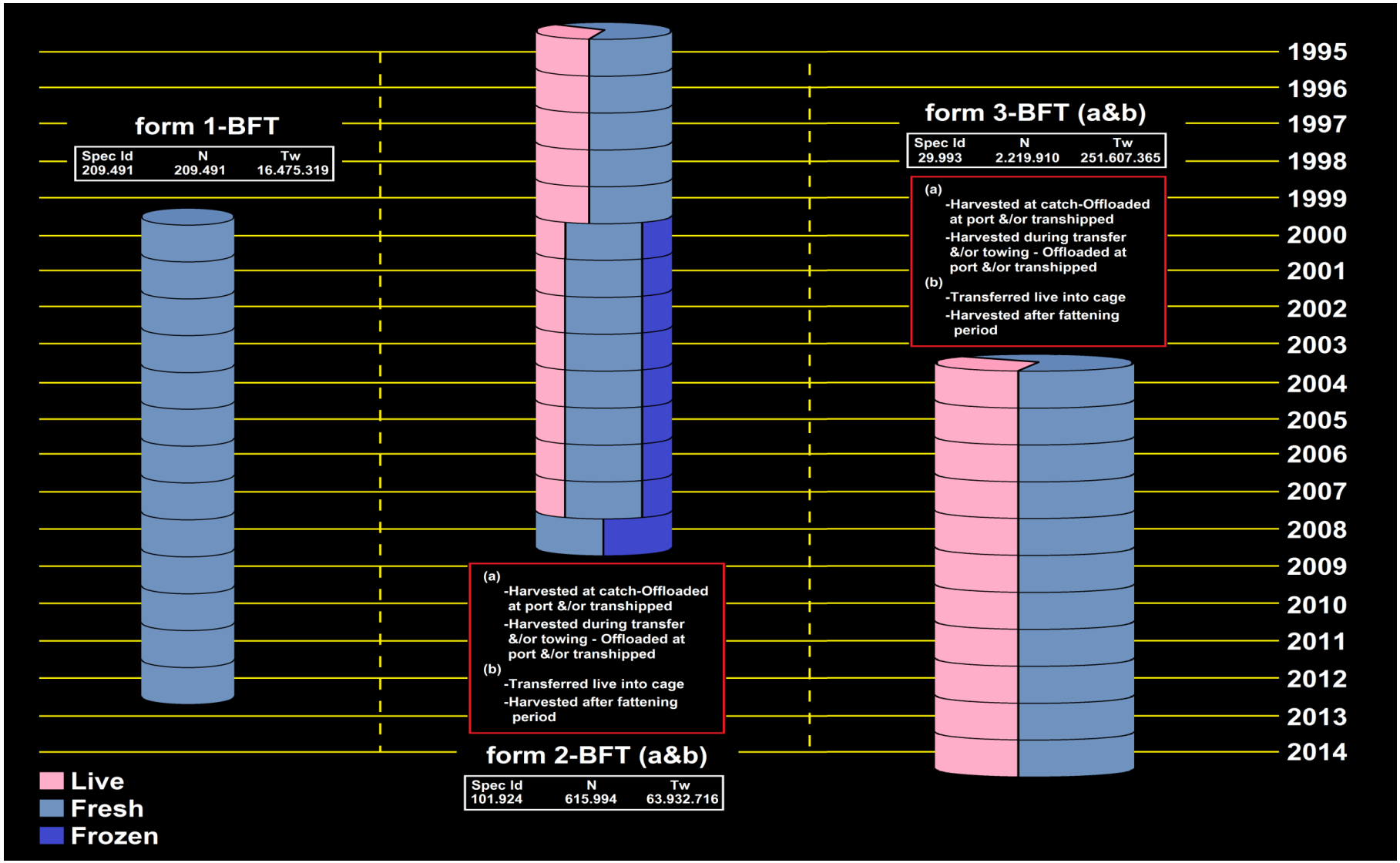


Figure 2. Chronology and structure of proposed form1, form2 and form3 recovered BFT independent biometric data sets for the period 1995 to 2014.

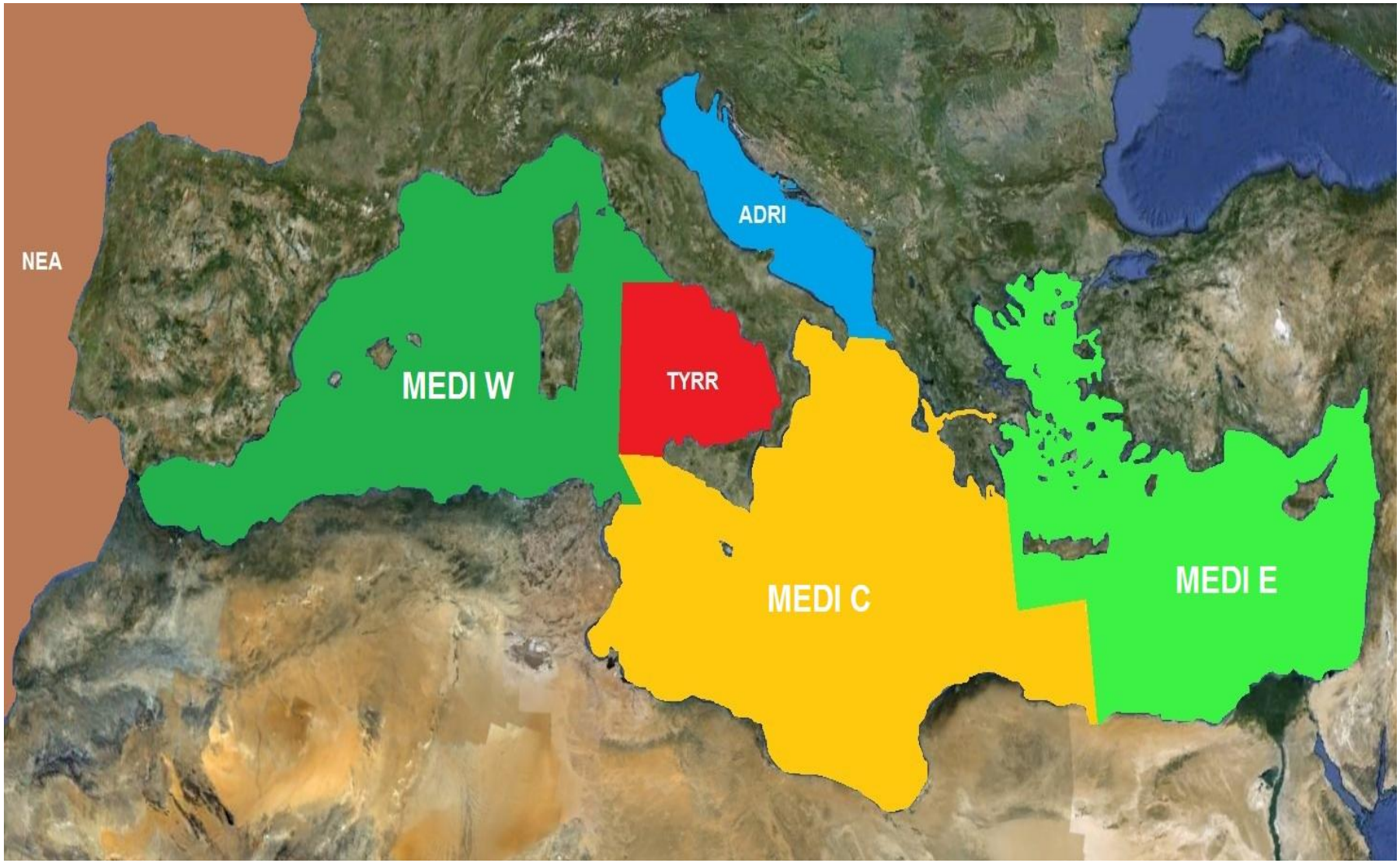
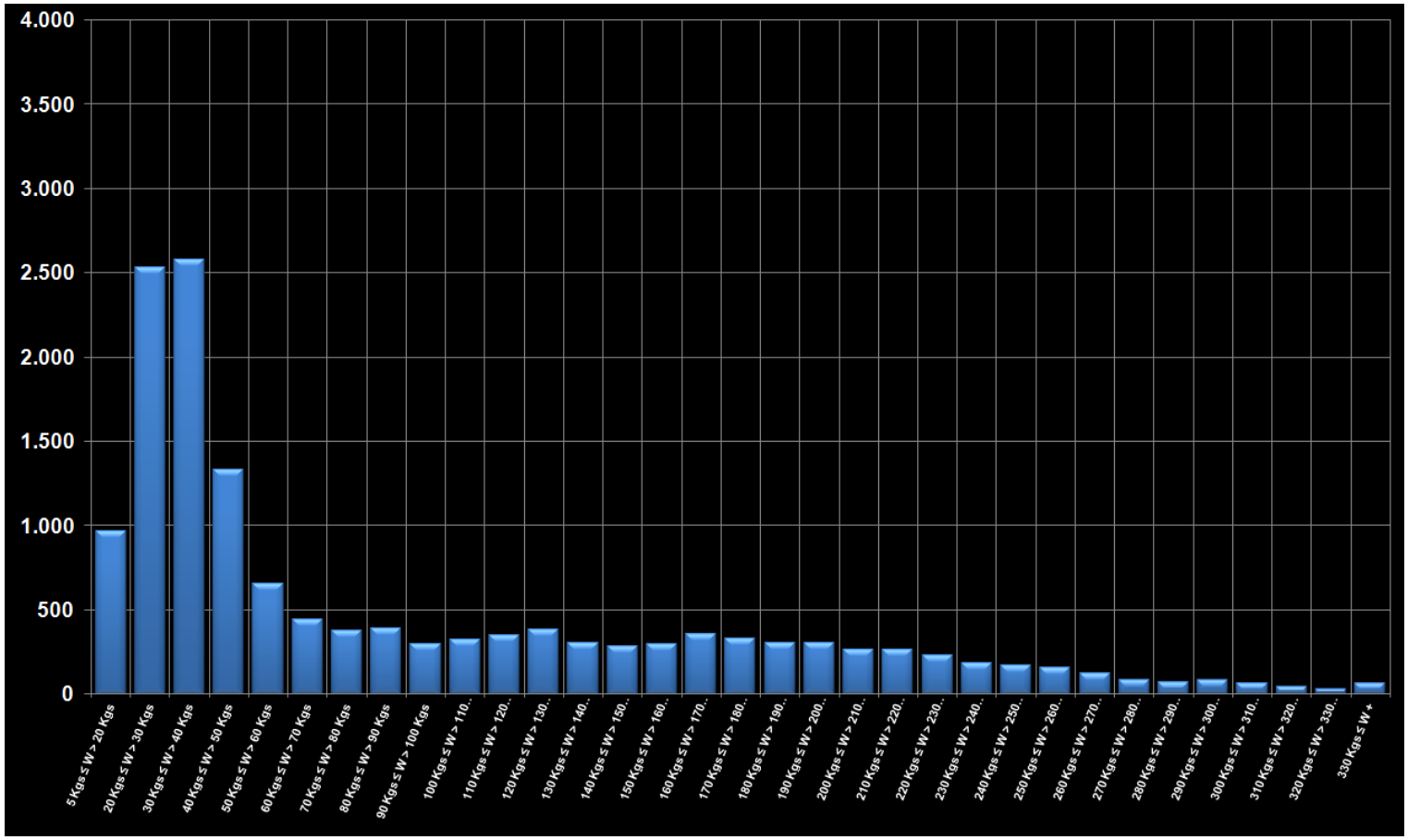
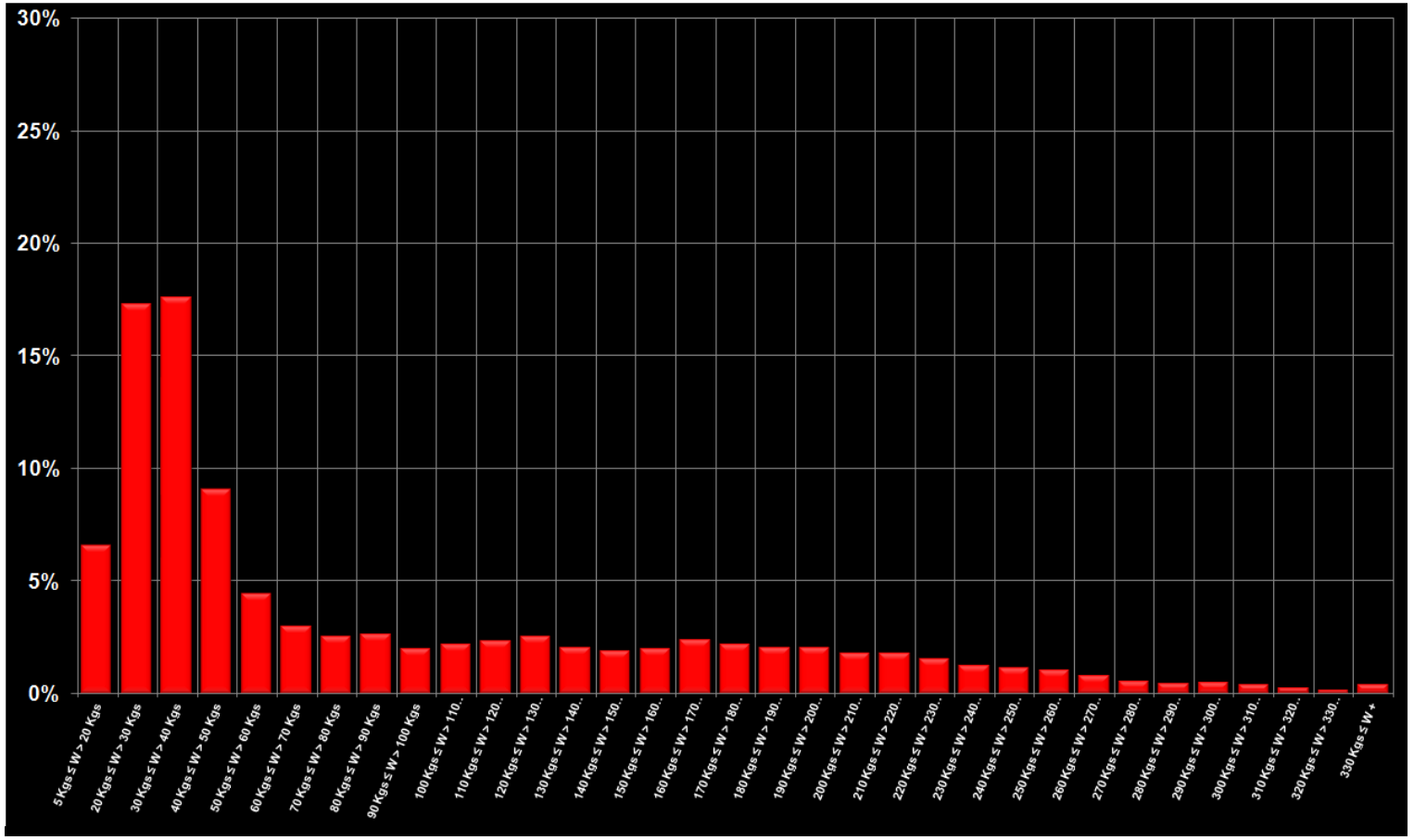
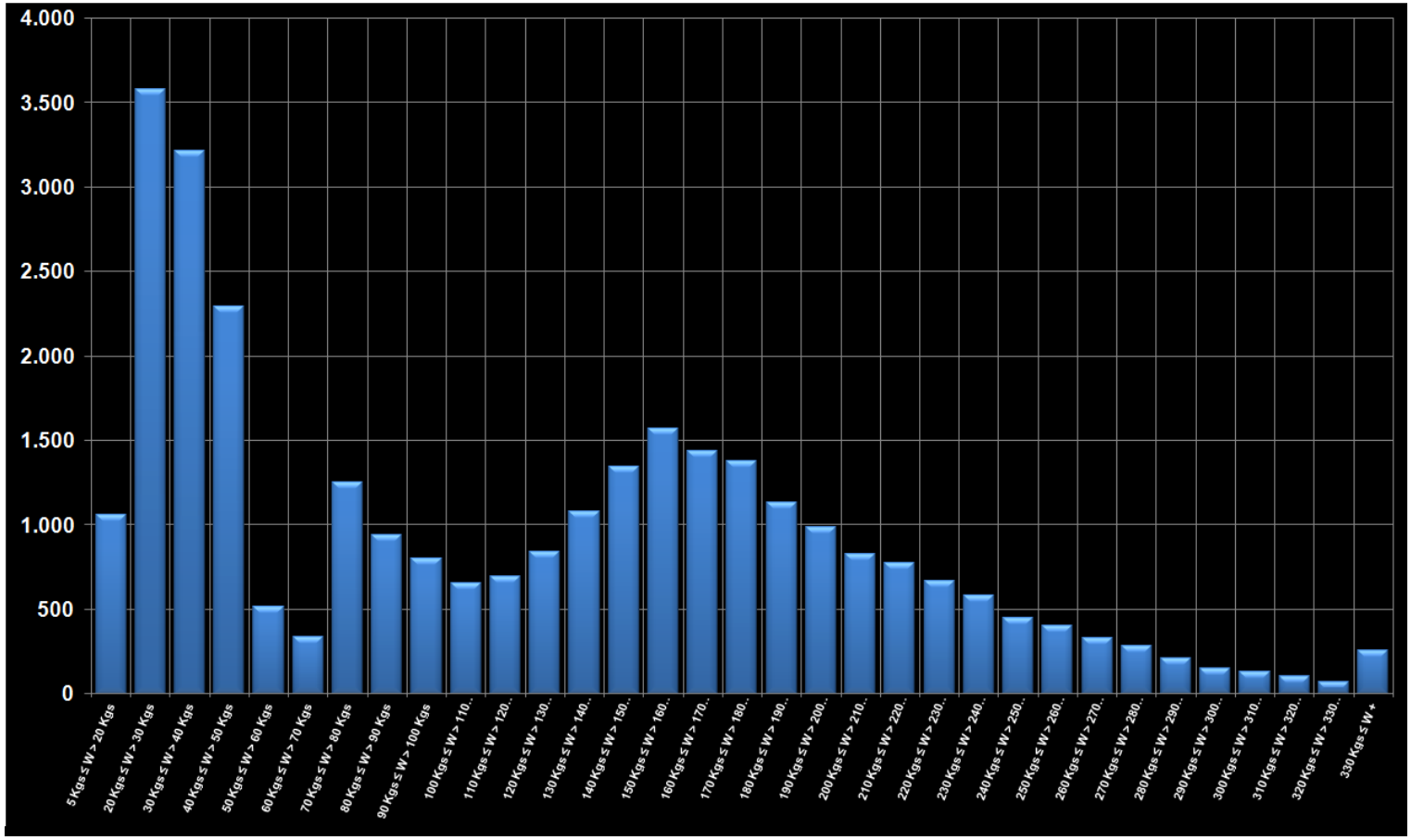


Figure 3. Used BFT catch geo-location format upon SCRS format requirements. for proposed form1, form2 and form3 recovered BFT independent biometric data sets for the period 1995 to 2014.


4.000
3.500
3.000
2.500
2.000
1.500
1.000
500
0
5 Kgs ≤ W > 20 Kgs
20 Kgs ≤ W > 30 Kgs
30 Kgs ≤ W > 40 Kgs
40 Kgs ≤ W > 50 Kgs
50 Kgs ≤ W > 60 Kgs
60 Kgs ≤ W > 70 Kgs
70 Kgs ≤ W > 80 Kgs
80 Kgs ≤ W > 90 Kgs
90 Kgs ≤ W > 100 Kgs
100 Kgs ≤ W > 110..
110 Kgs ≤ W > 120..
120 Kgs ≤ W > 130..
130 Kgs ≤ W > 140..
140 Kgs ≤ W > 150..
150 Kgs ≤ W > 160..
160 Kgs ≤ W > 170..
170 Kgs ≤ W > 180..
180 Kgs ≤ W > 190..
190 Kgs ≤ W > 200..
200 Kgs ≤ W > 210..
210 Kgs ≤ W > 220..
220 Kgs ≤ W > 230..
230 Kgs ≤ W > 240..
240 Kgs ≤ W > 250..
250 Kgs ≤ W > 260..
260 Kgs ≤ W > 270..
270 Kgs ≤ W > 280..
280 Kgs ≤ W > 290..
290 Kgs ≤ W > 300..
300 Kgs ≤ W > 310..
310 Kgs ≤ W > 320..
320 Kgs ≤ W > 330..
330 Kgs ≤ W +



Figures 4 & 5. (Left) Size frequencies (total individuals) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2002.
(Right) Size frequencies (relative frequencies as percent of the total per wild size class) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2002.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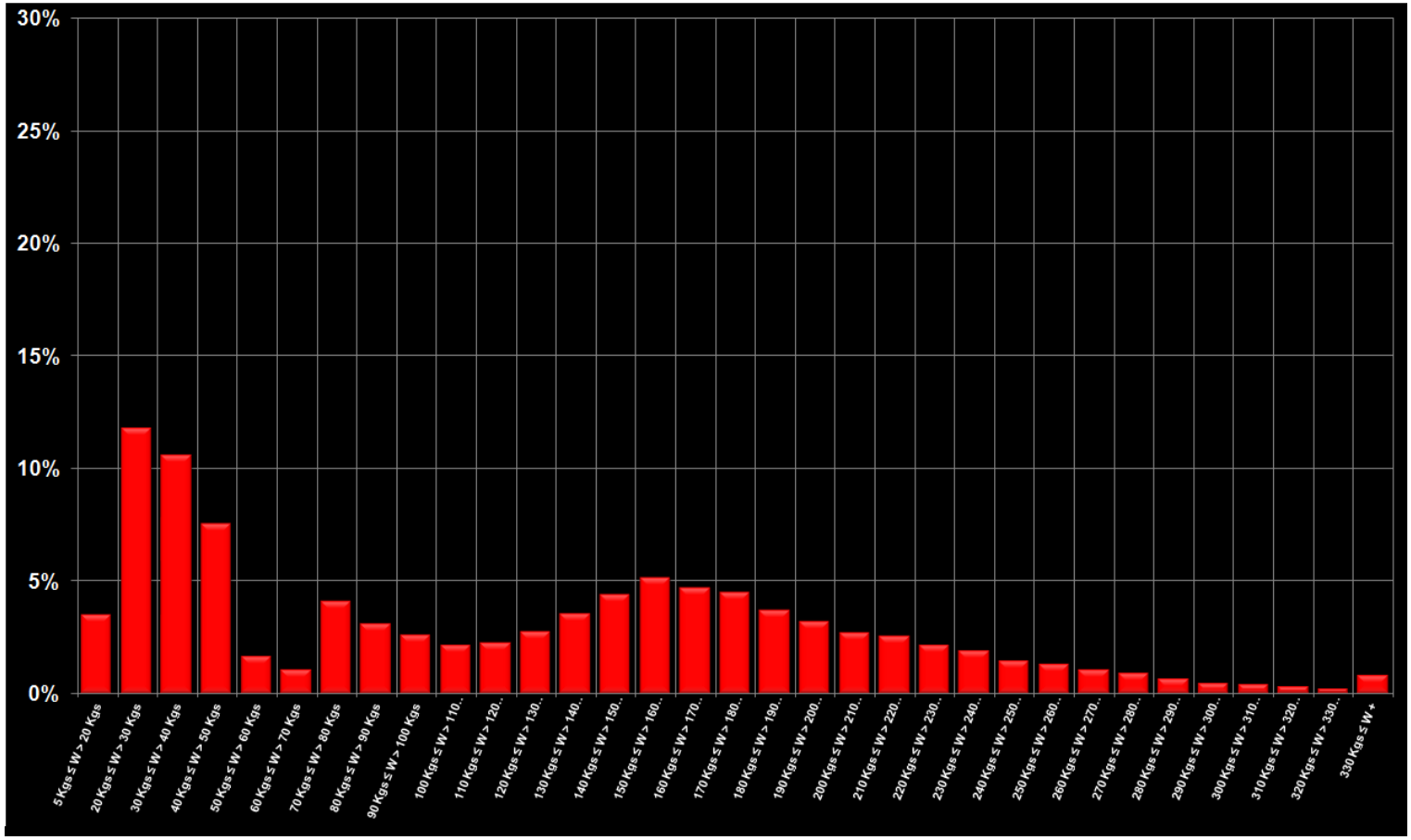
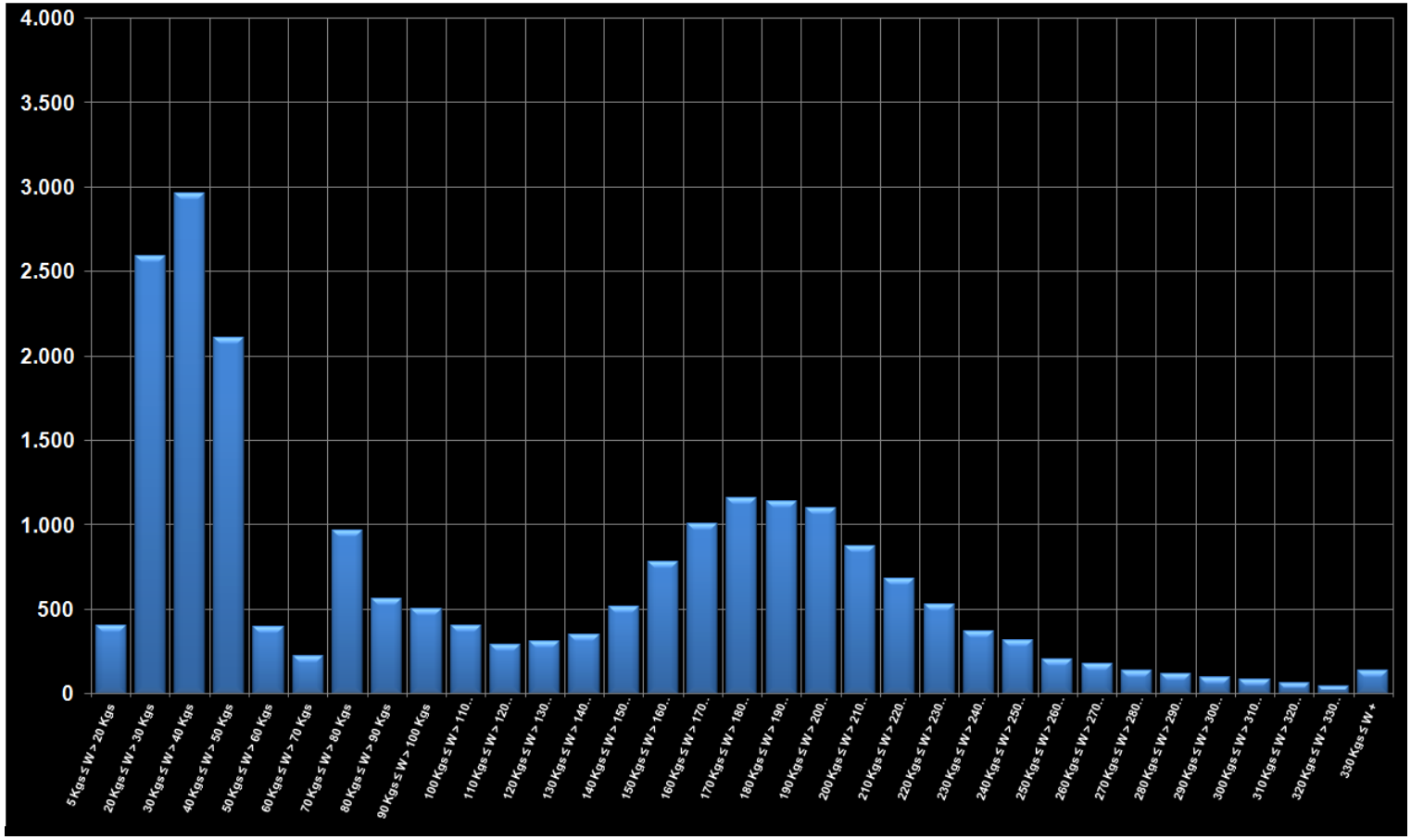


Figures 6 & 7. (Left)Size frequencies (total individuals) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2003. (Right) Size frequencies (relative frequencies as percent of the total per wild size class) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2003.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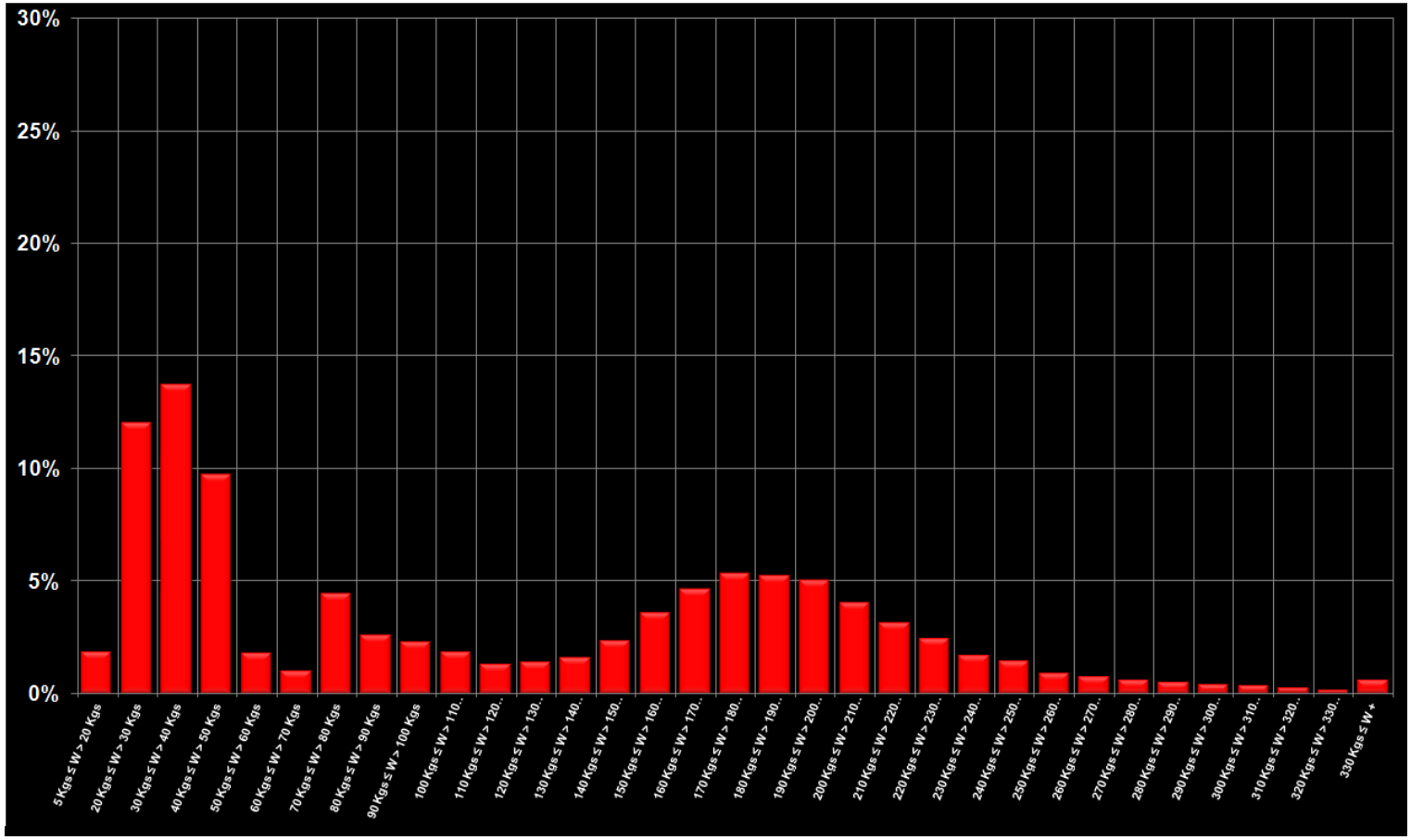
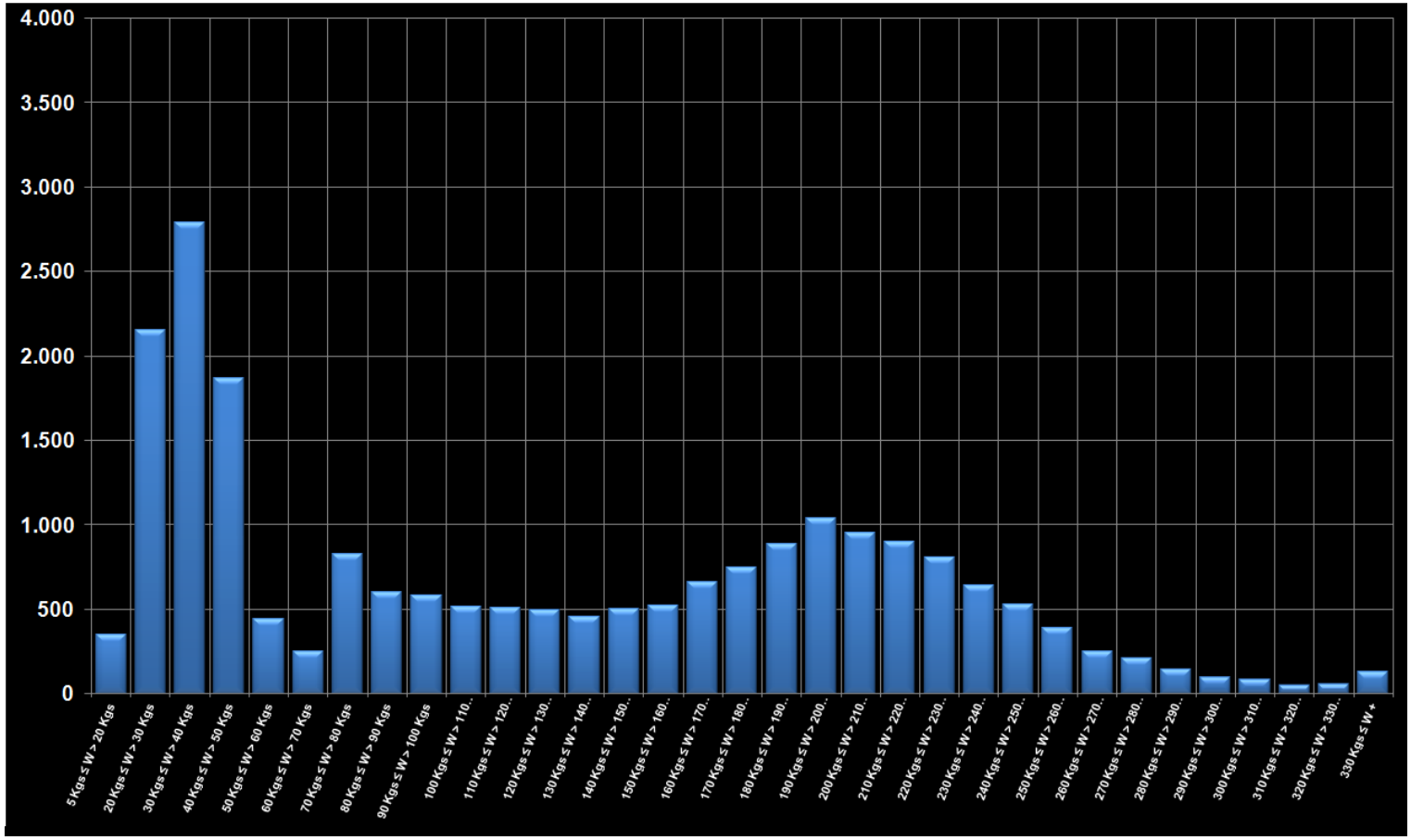


Figures 8 & 9. (Left). Size frequencies (total individuals) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2004. (Right) Size frequencies (relative frequencies as percent of the total per wild size class) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2004.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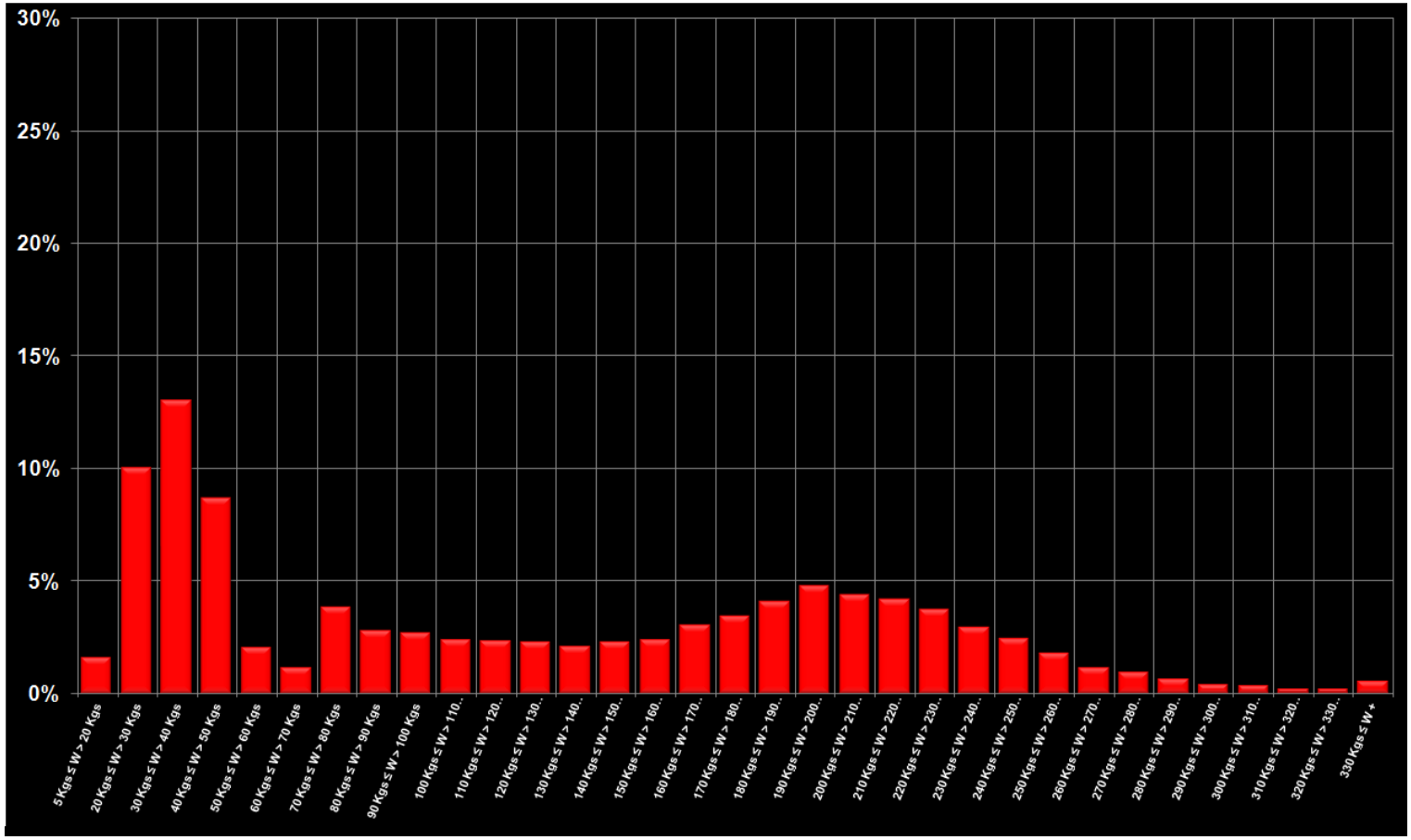
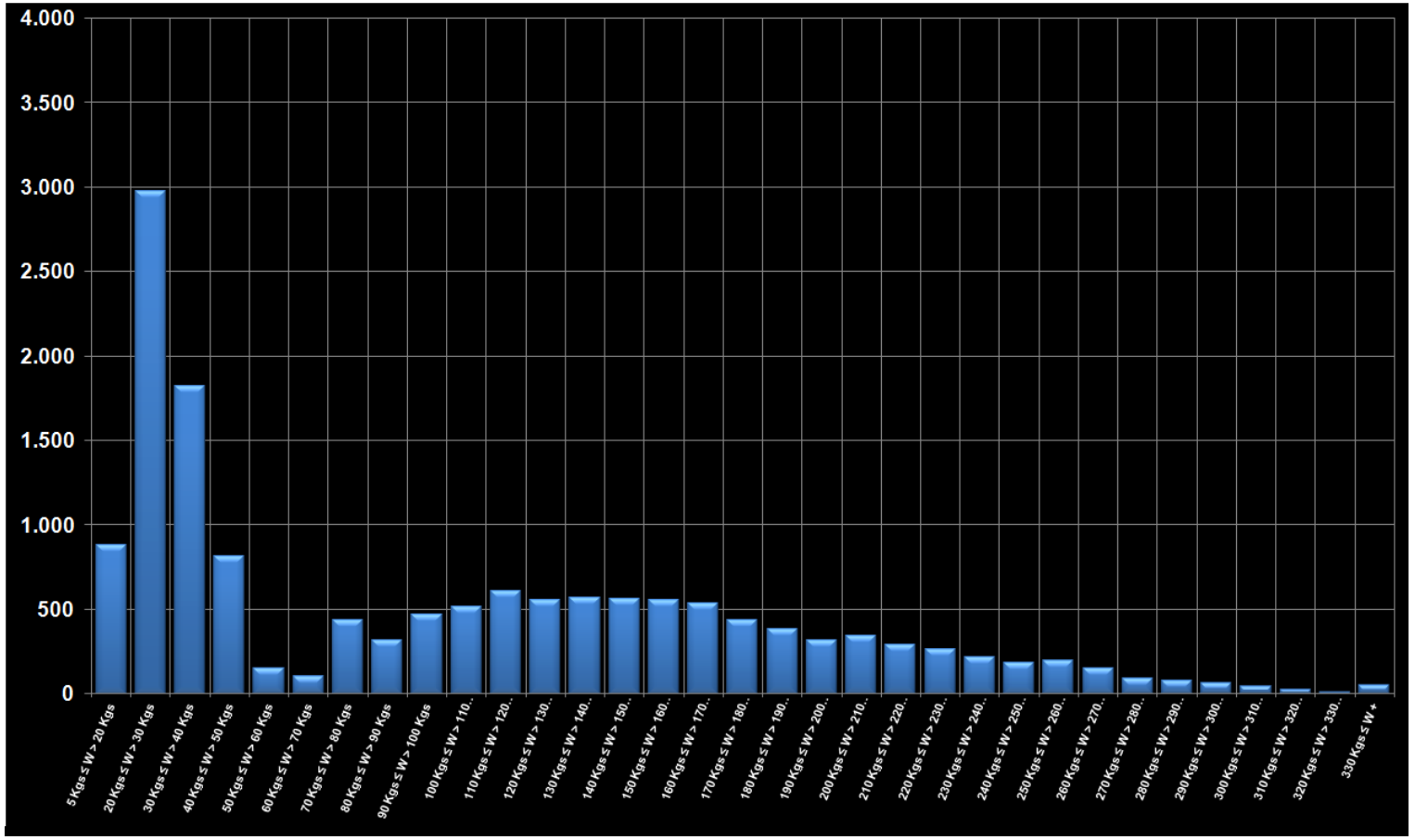


Figures 10 & 11. (Left) Size frequencies (total individuals) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2005. (Right)Size frequencies (relative frequencies as percent of the total per wild size class) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2005.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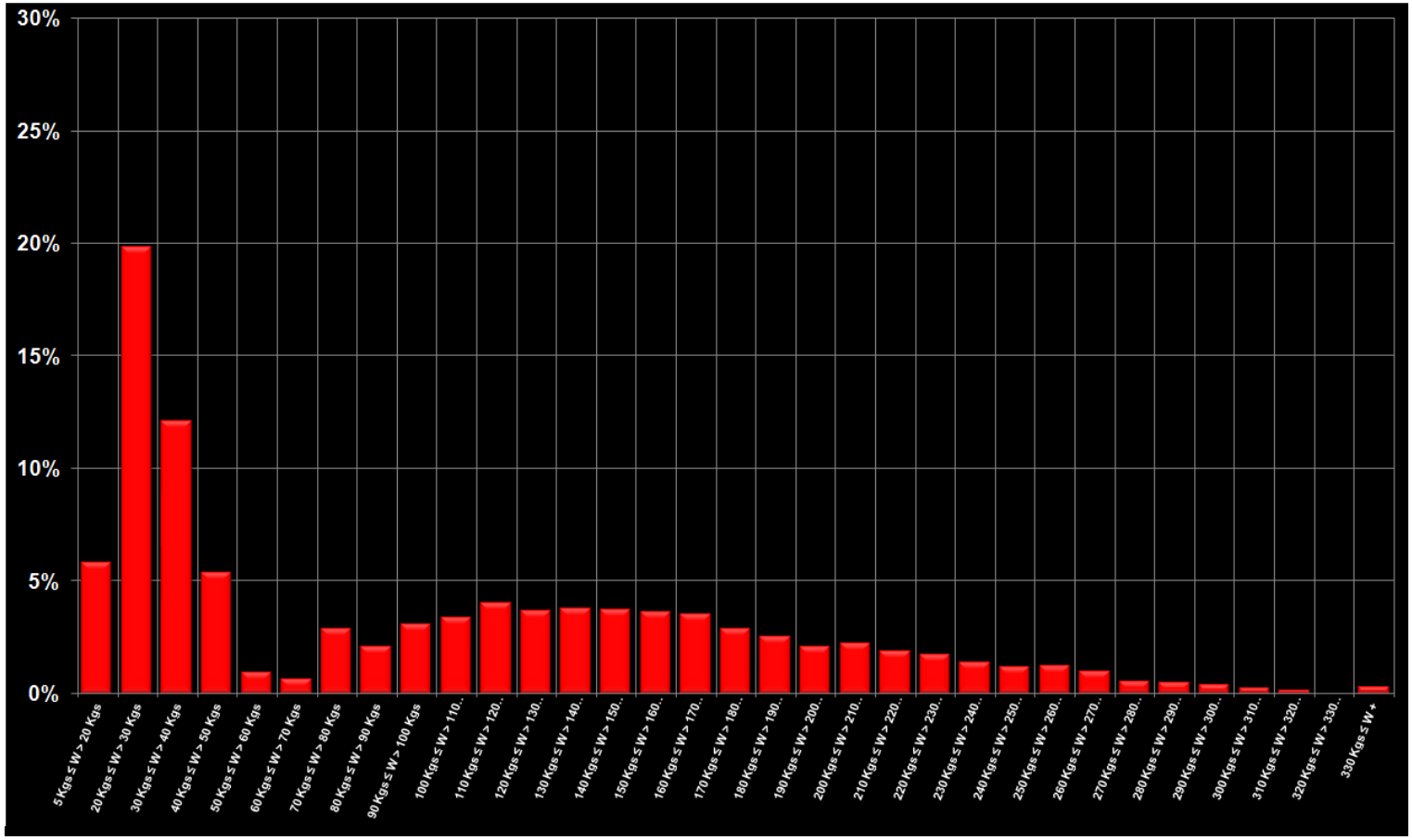
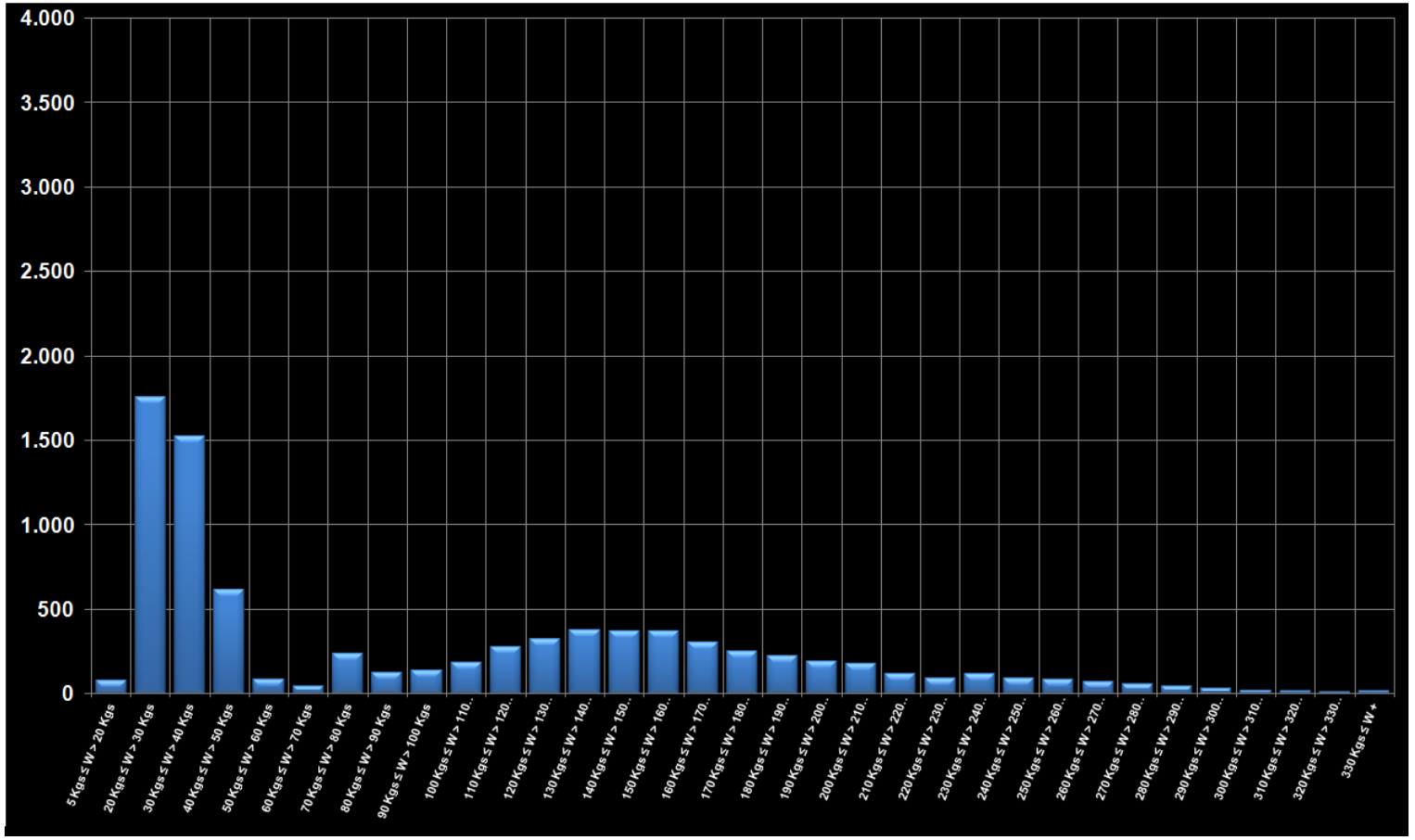


Figures 12 & 13. (Left)Size frequencies (total individuals) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2006. (Right) Size frequencies (relative frequencies as percent of the total per wild size class) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2006.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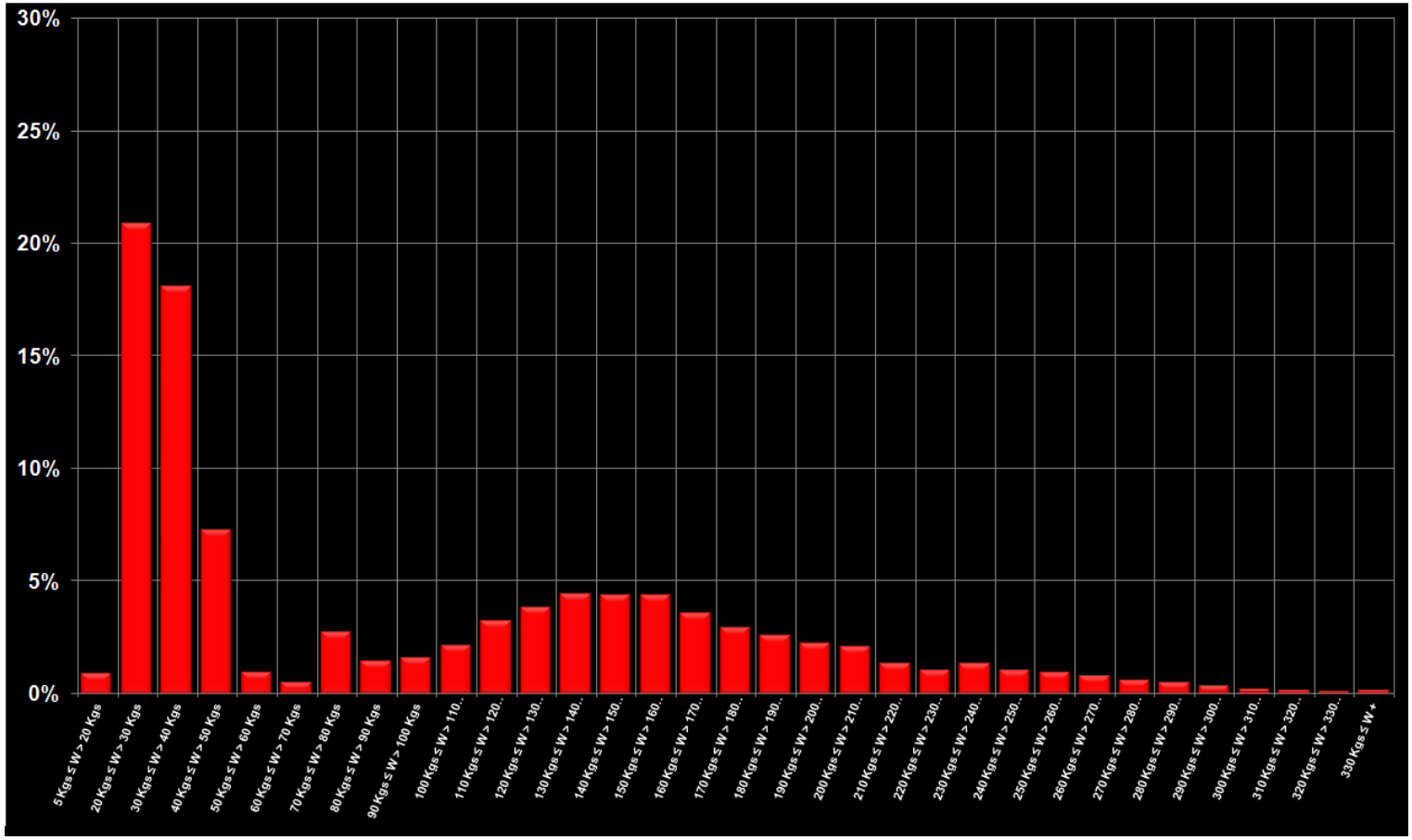
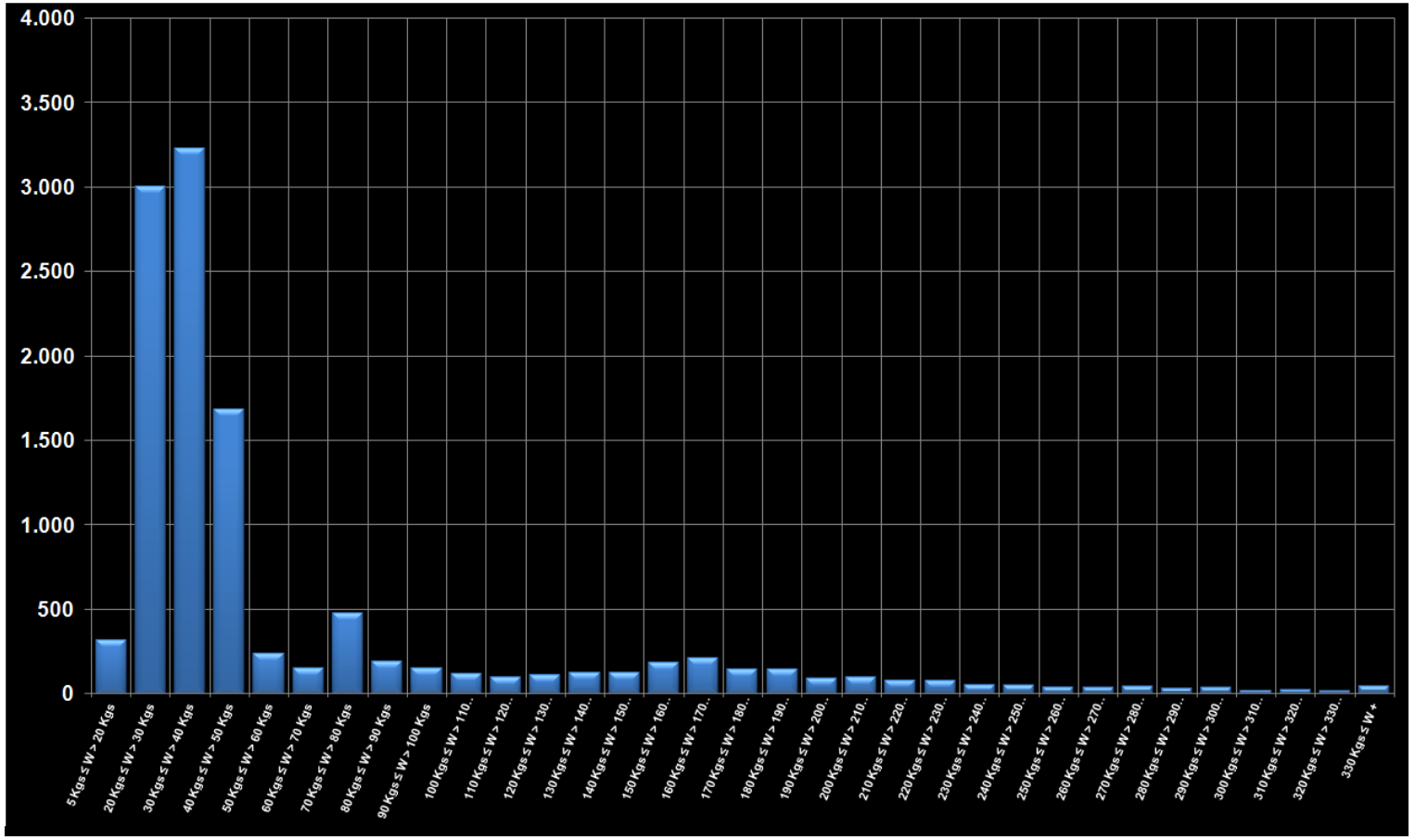


Figures 14 & 15. (Left) Size frequencies (total individuals) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2007. (Right) Size frequencies (relative frequencies as percent of the total per wild size class) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2007.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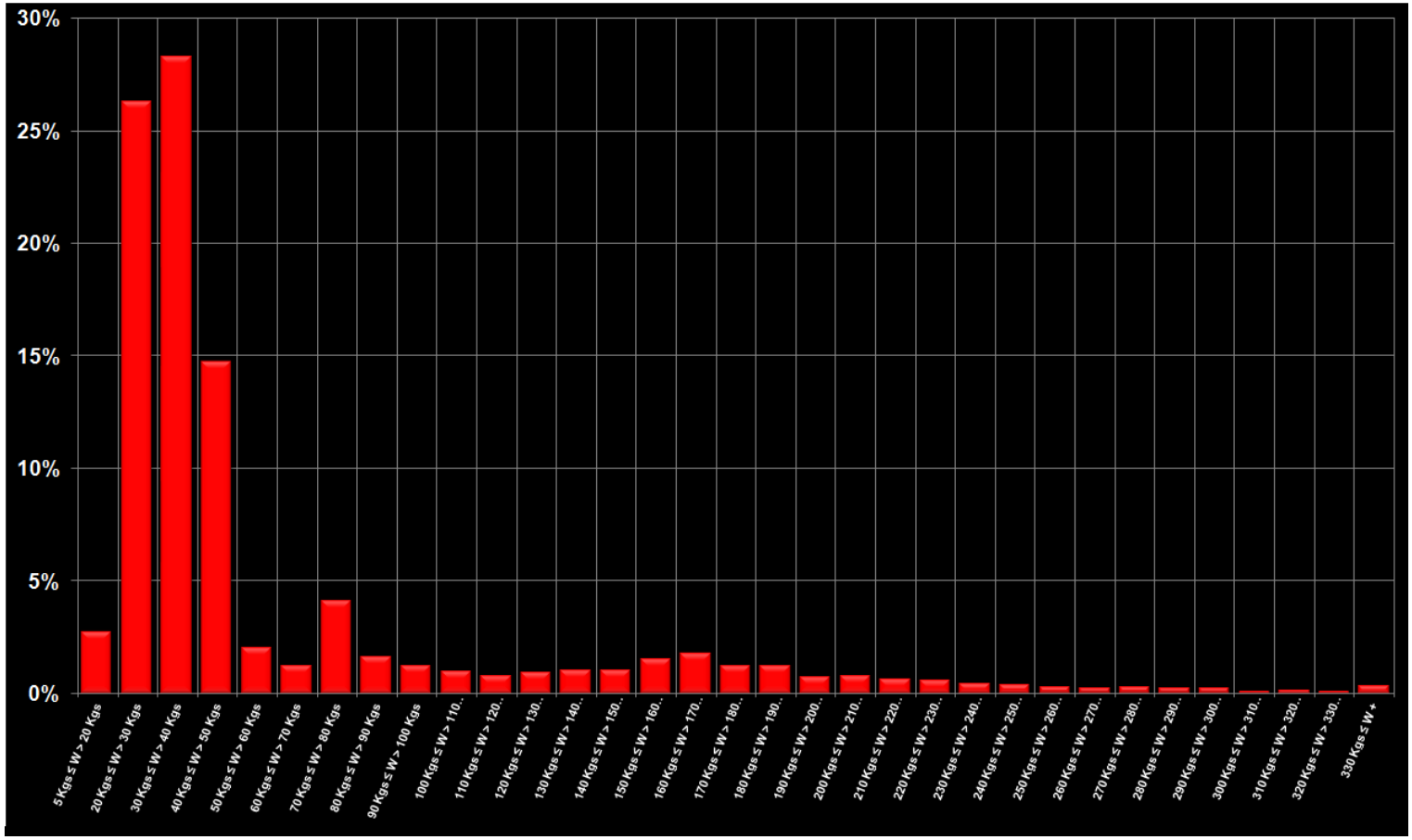
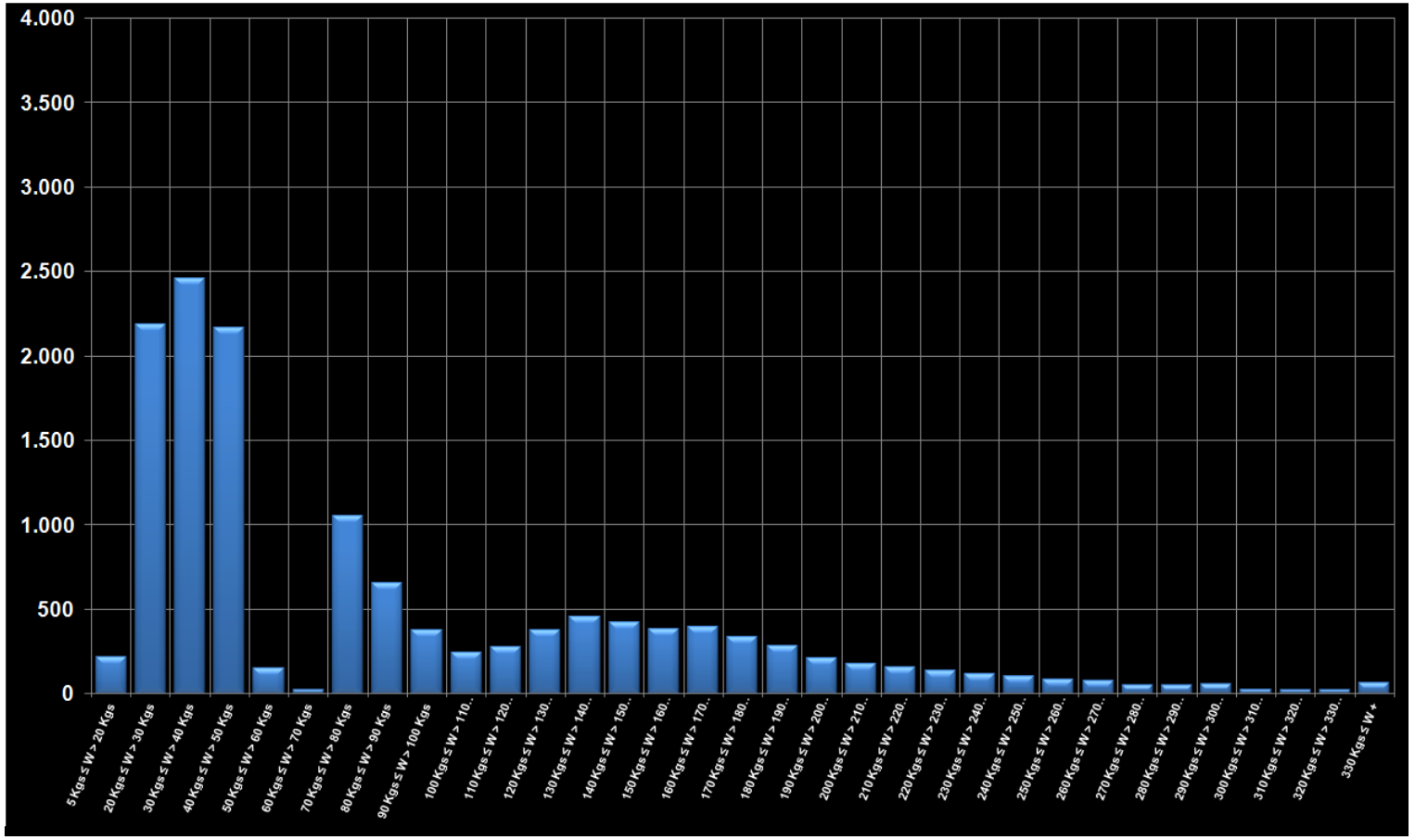
310 Kgs ≤ W > 320..
320 Kgs ≤ W > 330..
330 Kgs ≤ W +



Figures 16 & 17:(Left) Size frequencies (total individuals) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2008. (Right) Size frequencies (relative frequencies as percent of the total per wild size class) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2008.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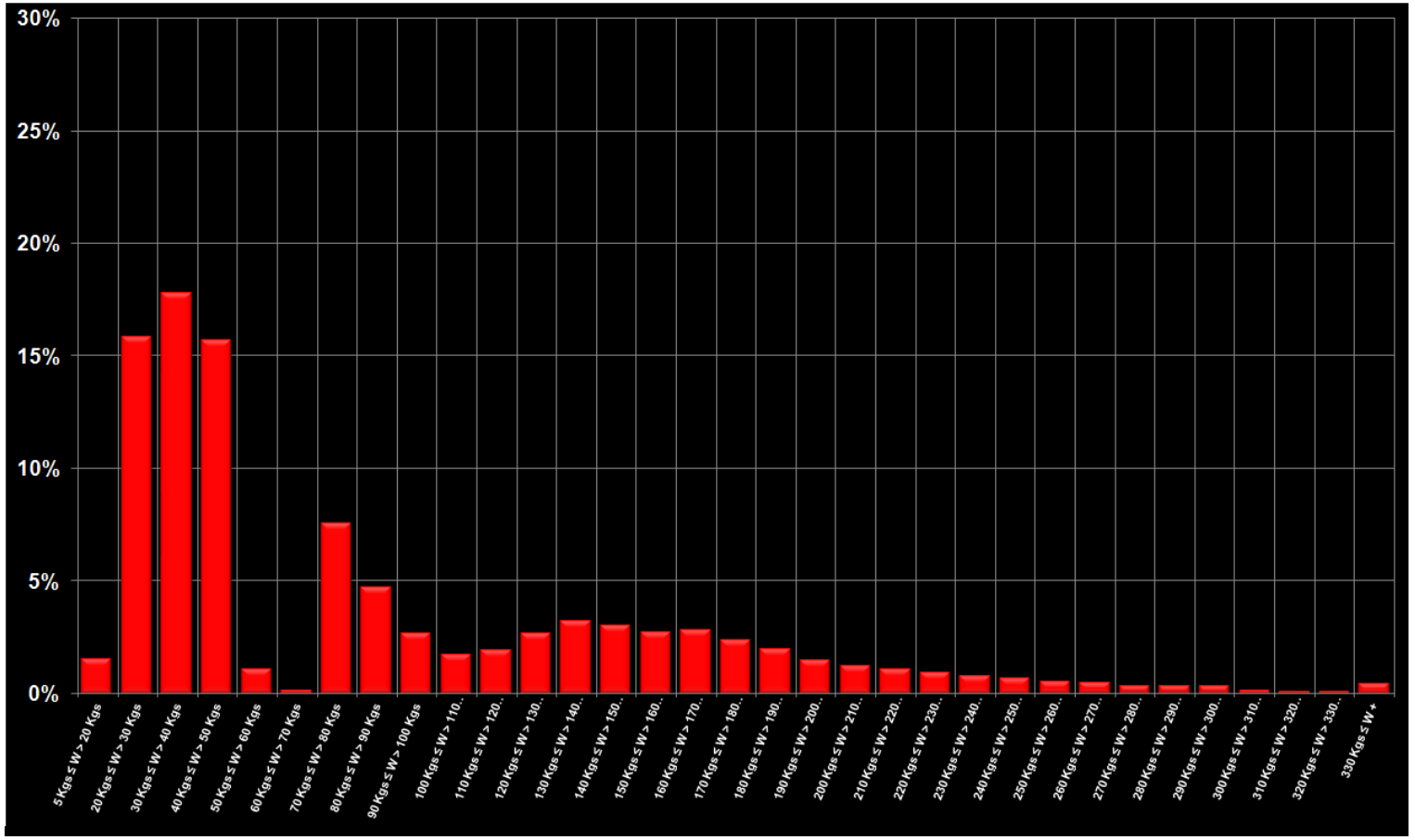
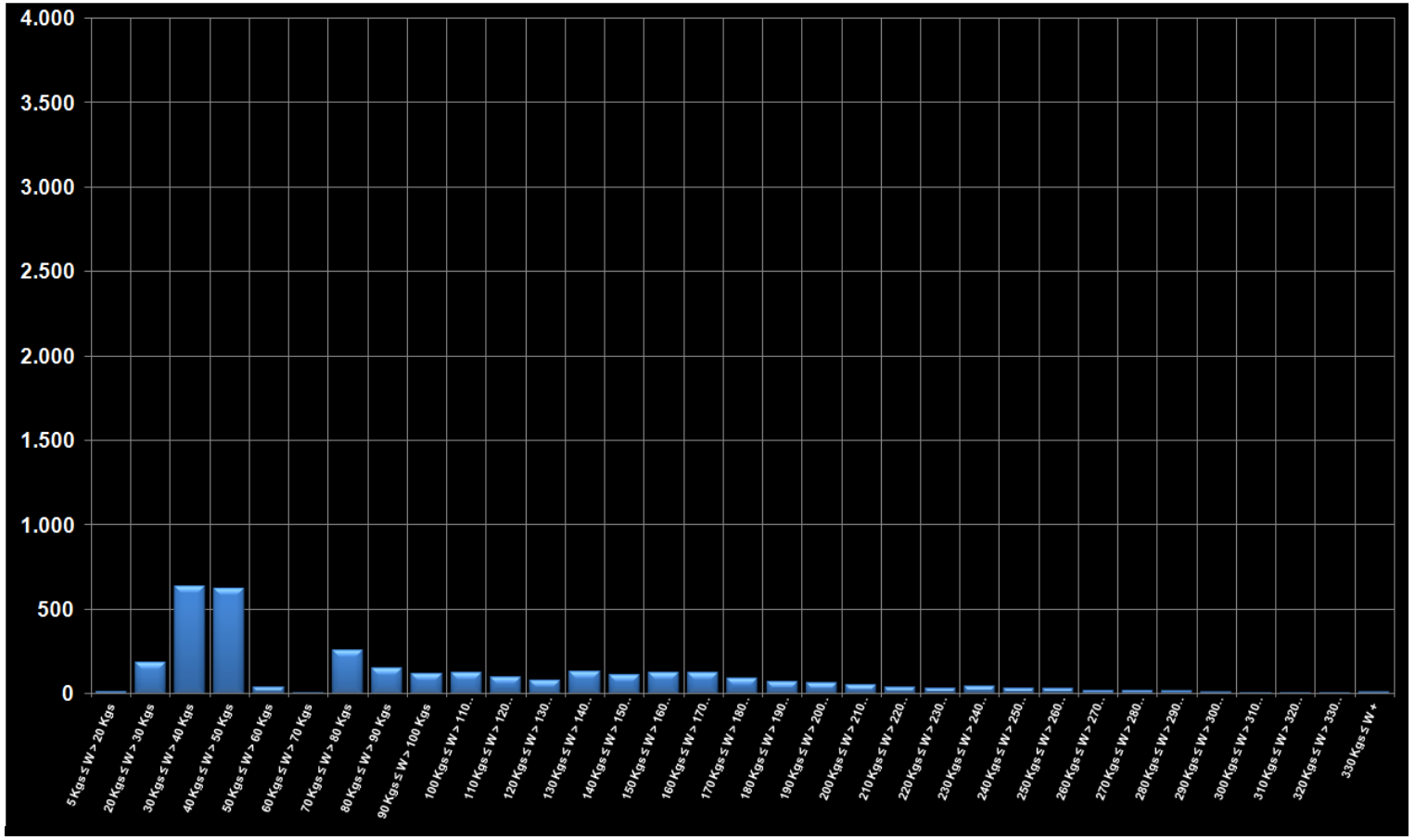
330 Kgs ≤ W +



Figures 18 & 19. (Left) Size frequencies (total individuals) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2009. (Right) Size frequencies (relative frequencies as percent of the total per wild size class) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2009.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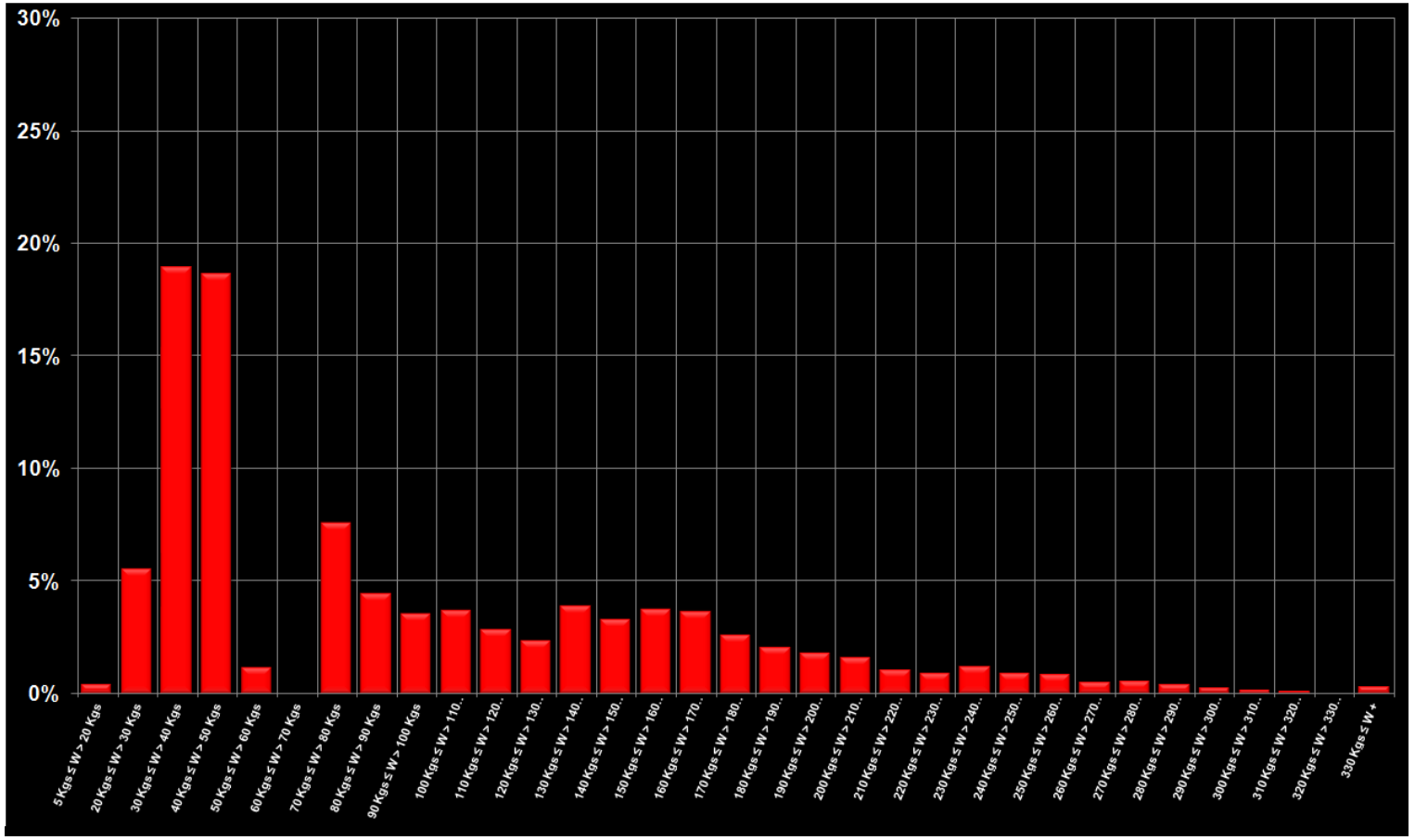
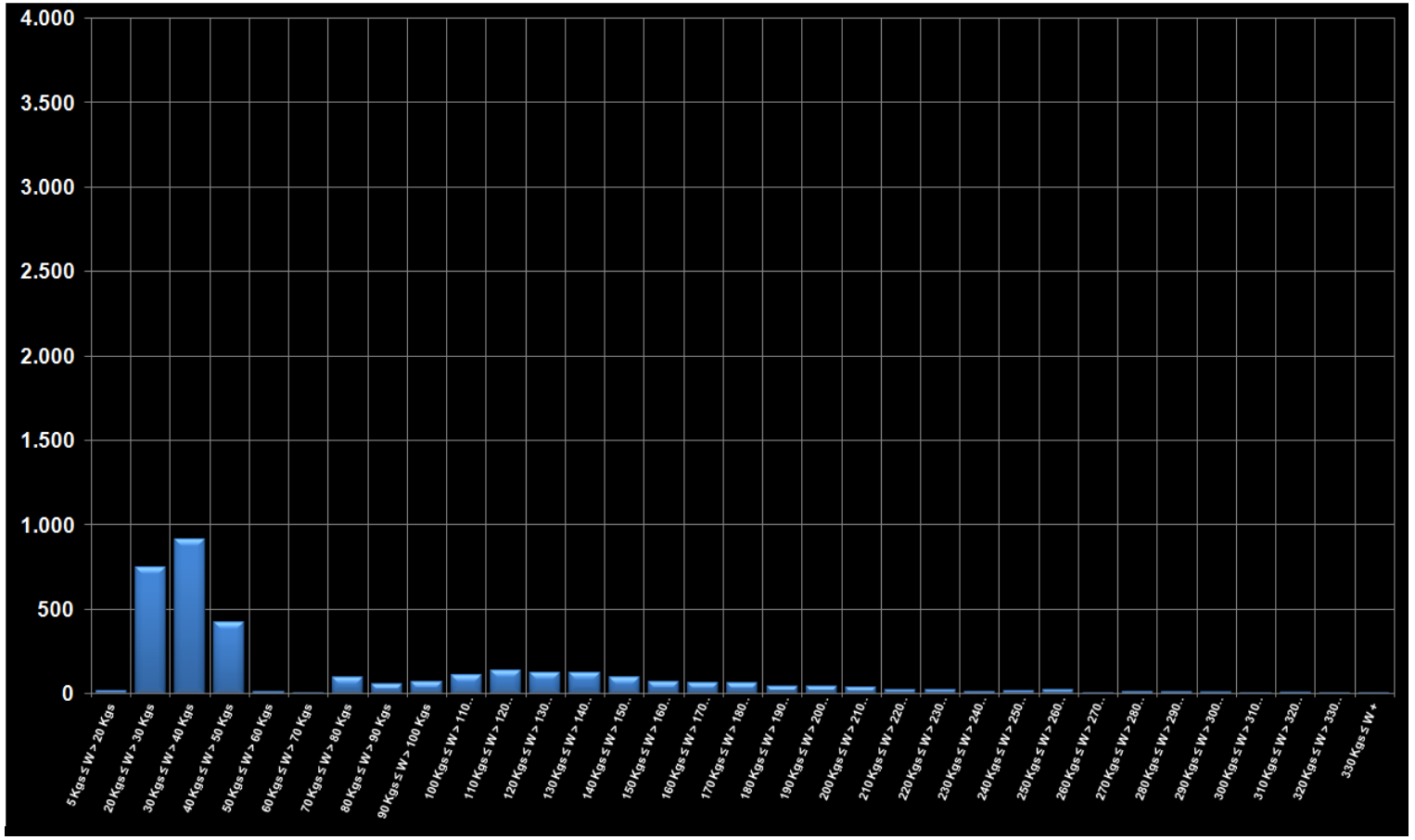


Figures 20 & 21. (Left) Size frequencies (total individuals) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2010. (Right) Size frequencies (relative frequencies as percent of the total per wild size class) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2010.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320 Kgs ≤ W > 330..
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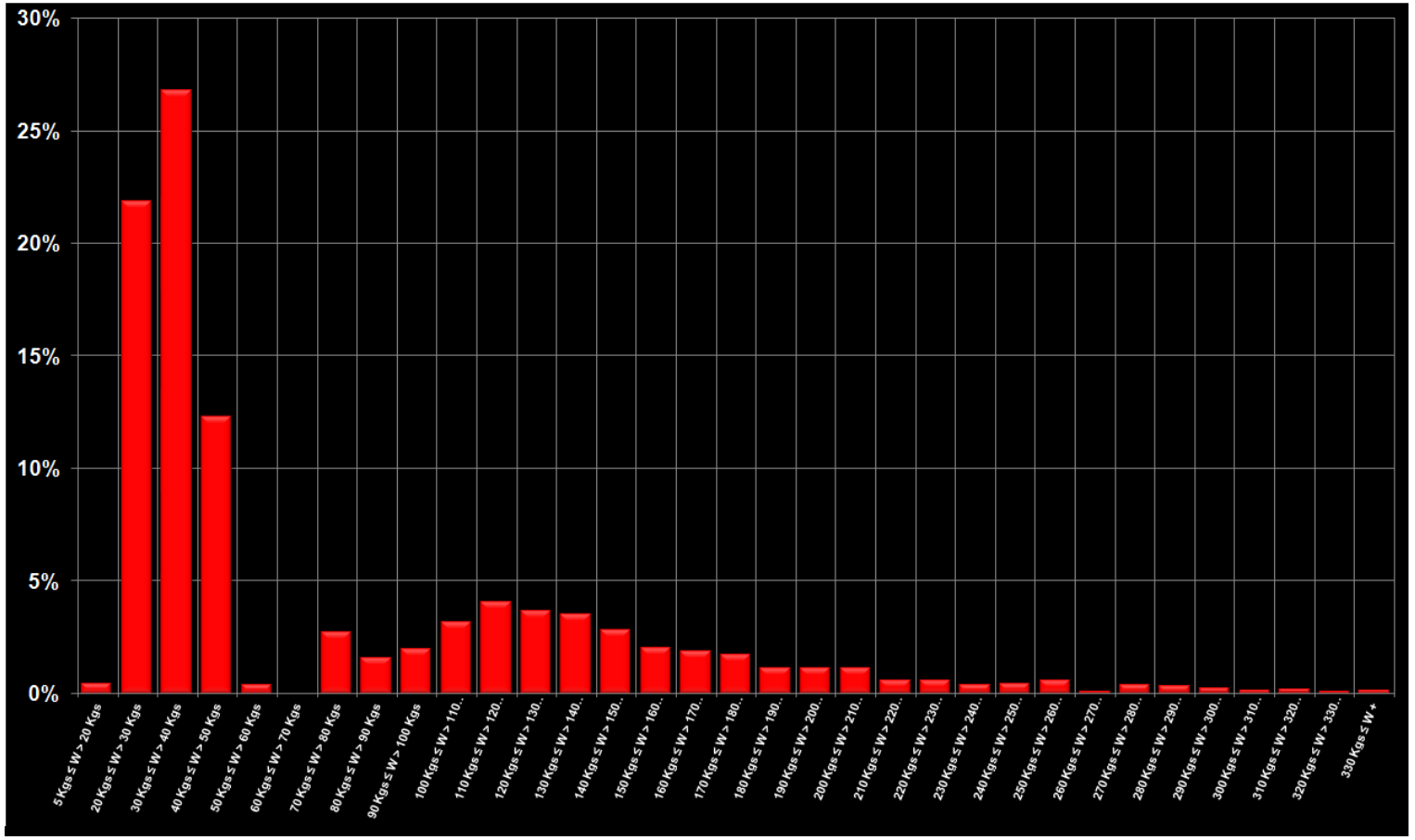
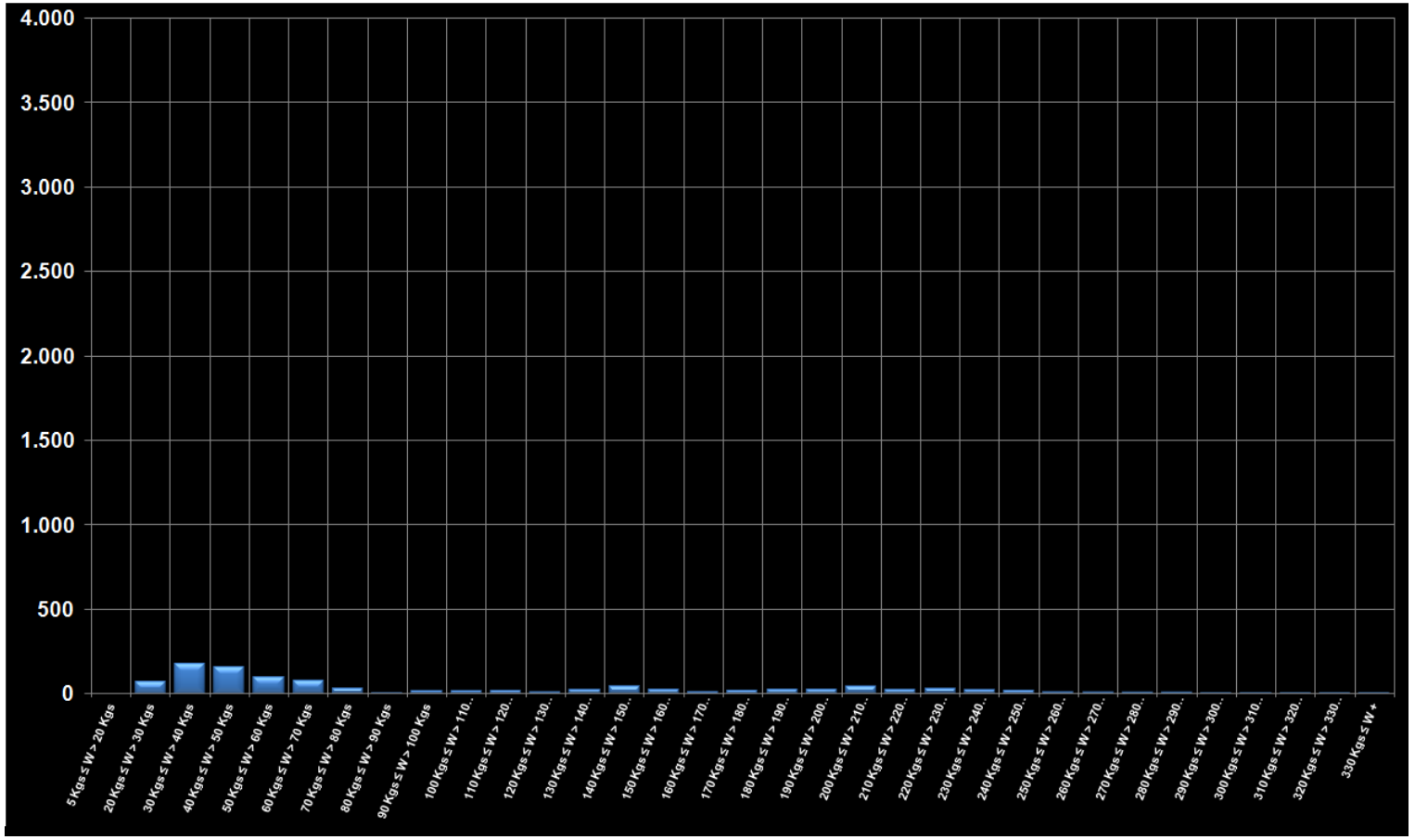


Figures 22 & 23. (Left) Size frequencies (total individuals) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2011. (Right) Size frequencies (relative frequencies as percent of the total per wild size class) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2011.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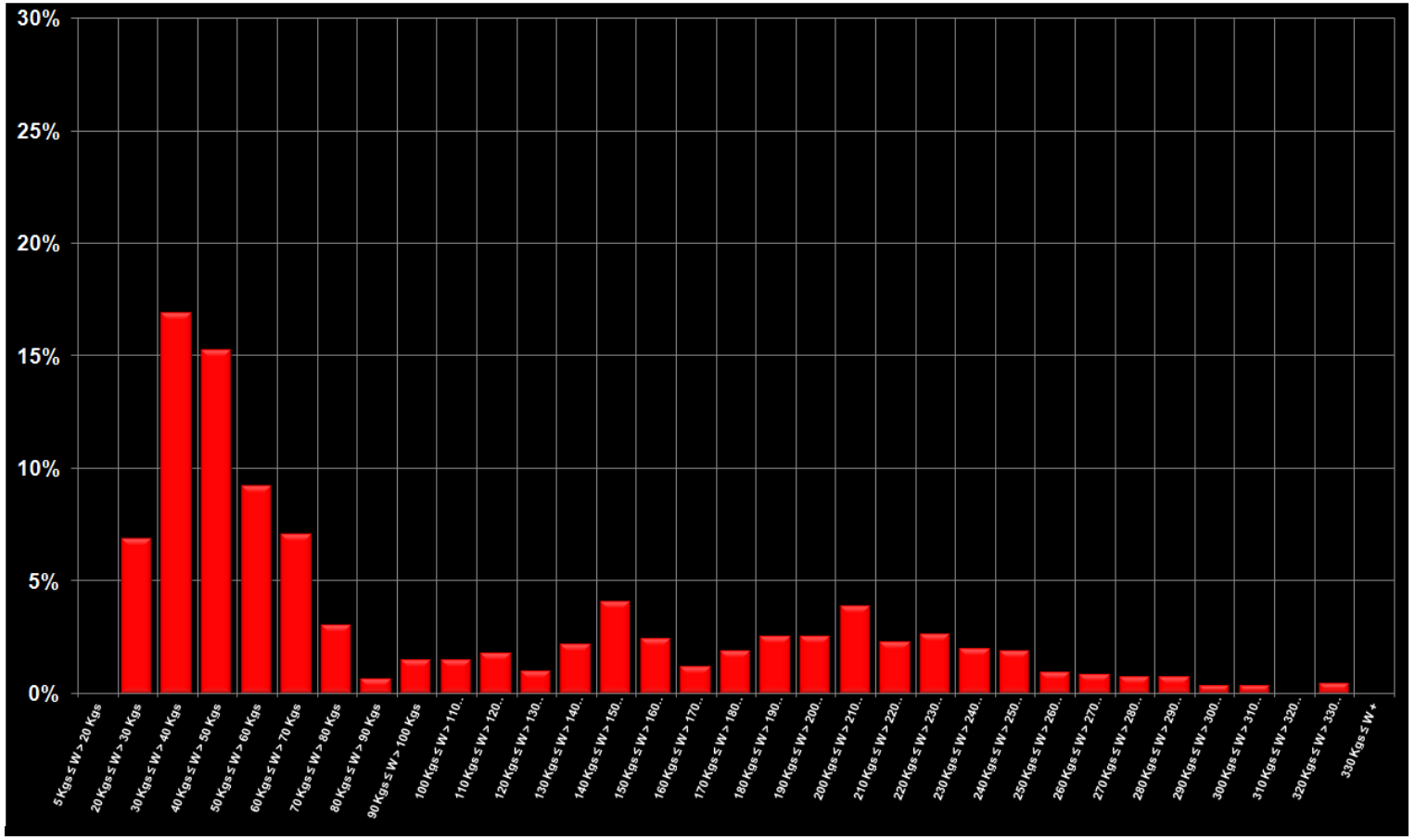

Figures 24 & 25. (Left) Size frequencies (total individuals) of E-BFT auctioned fresh in Japan corresponding to fish caught during 2012. (Right) Size frequencies (relative frequencies as percent of the total per wild size class) of E-BFT auctioned fresh in Japan corresponding to fish caught during Q1+Q2 2012.

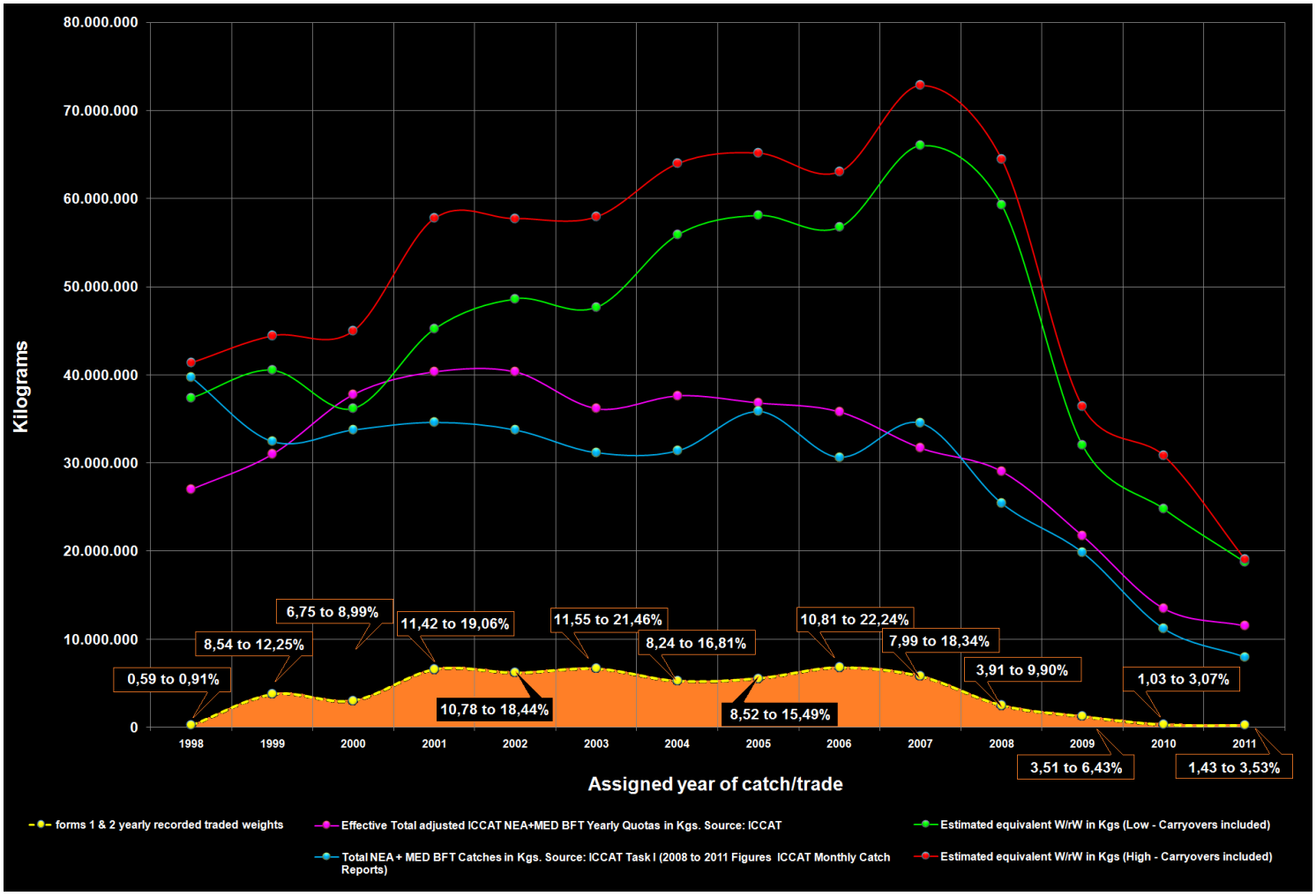

Figure 26. Provisional quantification of coverage significance in terms of percentage of biometric data contained in **forms 1a, 2a** and **2b** in comparison to Yearly effective Total adjusted ICCAT NEA+MED BFT Yearly Quotas in Kgs, Yearly total NEA + MED BFT Catches in Kgs, Yearly traded estimated equivalent W/rW in Kgs (Low - Carryovers not included), Yearly traded estimated equivalent W/rW in Kgs (High - Carryovers not included), Yearly traded estimated equivalent W/rW in Kgs (Low - Carryovers included) and Yearly traded estimated equivalent W/rW in Kgs (High - Carryovers included). Sources: ICCAT, ICCAT Task I (2008 to 2011 Figures ICCAT Monthly Catch Reports) and SCRS 2012 127 Mielgo Bregazzi R.

Annexes

List of flag codes

List of flag codes for reported EBFT exporters' nationality, as in **form1b_dsTradeBFTfresh (F) Japan Auction Markets and form1b_dsTradeBFTfresh (F) Japan Auction Markets original market reports:**

Ｂｌｕｅ Ｆｉｎ	ＢＦ		**Bluefin tuna Thunnus Thynnus thynnus**
「ＦＡＲＭ」	(FARMED)	「Ｆａｒ」	**Ranched**
「ＷＩＬＤ」	(WILD)	「wil」	**Wild caught**
「ＴＲＡＰ」			**Trap set net caught**
「ＬＩＮＥ」			**Longlined or handlined**
ＣＡＮ CANADA			**Canada (New England)**
ＢＯＳ BOSTON			**United States of America, Boston**
ＦＬＯ Florida			**United States of America, Miami-Florida**
ＮＣ Ｎｏｒｔｈ Ｃ			**United States of America, North Carolina**
Ｎｅｗ Ｙｏｒｋ			**United States of America, New York**
ＣＡＰＥ			**South Africa, Cape Town**
ＭＯＲ			**Morocco**
ＭＯＲ「ＴＲＡＰ」			**Morocco (Trap set net caught)**
ＣＲＯ CROATIA			**Croatia**
ＣＲＯ「ＦＡＲＭ」			**Croatia (Ranched)**
ＦＲＡ			**France**
ＧＲ GREECE			**Greece**
ＧＲ「Ｆａｒｍ」			**Greece (Ranched)**
ＩＴ ITA ITALY			**Italy**
ＩＴ「ＦＡＲＭ」			**Italy (Ranched)**
ＩＴ「ＴＲＡＰ」			**Italy (Trap set net caught)**
ＫＹＰ			**Cyprus**
ＫＹＰ「Ｆａｒｍ」			**Cyprus (Ranched)**
ＬＹＢ ＬＩＢ			**Libya**
ＭＬ			**Malta**
ＭＬ「Ｆａｒｍ」			**Malta (Ranched)**
ＰＯＲ PORTUGAL	ＰＯ		**Portugal**
ＰＯＲ「Ｆａｒｍ」			**Portugal (Ranched)**
ＰＯＲ「ＴＲＡＰ」			**Portugal (Trap set net caught)**
Ｓｐａｉｎ SPAIN			**Spain**
ＳＰ「Ｆａｒｍ」	ＳＰ「養」	ＳＰ「Ｆａｒ」	**Spain (Ranched)**
ＳＰ「ＴＲＡＰ」			**Spain (Trap set net caught)**
ＴＫ			**Turkey**
ＴＲ			**Turkey**
ＴＫ「Ｆａｒｍ」			**Turkey (Ranched)**
ＴＵ TUNISIA			**Tunisia**
ＴＵ「Ｆａｒｍ」			**Tunisia (Ranched)**
ＴＩＷ ＴＩＷＡＮ			**Taiwan**
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