

AN UNKNOWN BLUEFIN TUNA FISHERY AND INDUSTRY IN TENERIFE (CANARY ISLANDS, SPAIN) IN THE EARLY XX CENTURY: THE FLORIO ENTREPRISE

Antonio Di Natale¹

SUMMARY

Intensive bluefin tuna (and other tunas) fishing was carried out in the 1920s on the island of Tenerife by the most important Italian industrial group at that time, the “F.lli I. & V. Florio”. Information on this activity is however extremely poor and it was necessary to carry out a very difficult and intensive investigation to recover at least the essential basic data. The fishing was carried out only for about a decade by local vessels, providing high catches at least in some years. At the same time, the Florios established a canning and salting factory in southwestern Tenerife, which was closed after a short time due to financial problems. This paper presents the available information on this activity, which was completely unknown to fishery science up to now and which is another missing piece of the big puzzle of the bluefin tuna natural history. This fishery also allows us to speculate about a possible sub-population of bluefin tuna close to the Ibero-Moroccan area.

RÉSUMÉ

La pêche intensive du thon rouge (et d'autres thonidés) a été réalisée dans les années 20 sur l'île de Tenerife par le plus important groupe industriel italien à cette époque, le « F.lli I. & V. Florio ». Les informations sur cette activité sont toutefois extrêmement rares et il s'est avéré nécessaire de mener une enquête très difficile et intensive afin de récupérer au moins les données de base essentielles. La pêche a été réalisée uniquement pendant une dizaine d'années par des navires locaux, obtenant des prises élevées au moins pendant quelques années. Dans le même temps, les Florios ont mis en place une usine de mise en conserve et de salage dans le Sud-Ouest de Tenerife, laquelle a été fermée quelque temps après en raison de problèmes financiers. Ce document présente les informations disponibles sur cette activité, totalement méconnue jusqu'à présent de la science halieutique et qui est une autre pièce manquante du grand puzzle que constitue l'histoire naturelle du thon rouge. Cette pêcherie permet aussi de spéculer sur une possible sous-population de thon rouge à proximité de la zone ibéro-marocaine.

RESUMEN

En los años 20, en la isla de Tenerife, se llevó a cabo una pesca intensiva de atún rojo (y de otros túnidos) por parte del grupo industrial italiano más importante de aquél momento, “F.lli I. & V. Florio”. Sin embargo, la información sobre estas actividades es bastante escasa y fue necesario llevar a cabo una investigación intensiva bastante difícil para recuperar al menos los datos básicos esenciales. La pesca la realizaron solo durante una década los barcos locales, logrando elevadas capturas al menos algunos años. Al mismo tiempo, Florios estableció una planta enlatadora y saladora en la parte sudoccidental de Tenerife, que se cerró al poco tiempo debido a problemas financieros. Este documento presenta la información disponible sobre estas actividades, que eran completamente desconocidas para la ciencia pesquera hasta ahora y que es otra pieza que faltaba en el gran puzzle de la historia natural del atún rojo. Esta pesquería nos permite también especular acerca de una posible subpoblación de atún rojo cerca de la zona ibero-marroquí.

KEYWORDS

*Bluefin tuna, Seafood industry, Atlantic Ocean,
Canary Islands, Fishery history, Fish distribution*

¹ICCAT, GBYP, Corazón de Maria 8, 6a, 28002 Madrid, Spain.

1. Introduction

The Florio dynasty marked the history for a couple of centuries from many points of view. The Florio family has an important place in Italian and European history, not only because of its immense patrimony at some stages and the vast range of industrial activities it carried out for many years, but also for its very active social life which marked that time.

The Florio's family originated in Bagnara Calabria (a small fishing village along the southern Tyrrhenian coast of Calabria, Italy, close to the Strait of Messina) but developed its fortune mostly in Sicily, between the XIX and the early part of the XX century, when it was based in Palermo. The Florios were important ship owners, as well as owners of ceramic and pottery industries, iron factories, tools industries, sulphur mines, insurance owners, agriculture producers, cotton producers and manufacturers, tobacco producers and manufactures, winemakers and traders, bankers, land and building owners, newspaper editors, and also important tuna trap and tuna canning industry owners. At a certain point, their fortune was one of the biggest in Europe, certainly the biggest in the Mediterranean area, and they were very good friends of the most important European families in Europe, including all royal families, the Kaiser William II and the Russian Tsar. The history of this important family and its activities in the tuna fishery is reported in many books and papers, which provides all details about its activities and lifestyles (Giuffrida, 1975; Fierotti Agrigento, 1983; Sarà, 1983, 1998; Lentini, 1984, 2008, 2013; D'Angelo, 1985; Giuffrida and Lentini, 1985; Candela, 1986; Barone, 1991; Ravazza, 2007; Alongi *et al.*, 2008; Cancilia, 2008; Burri *et al.*, 2009; Marasà, 2010; Requirez, 2011; Anon., 2013a; Li Vigni, 2013; Pitrone, 2014). However, it is sometimes difficult to follow the family history, because of the many repeated names in the short genealogy (there are 4 Ignazios and 3 Vincenzos in less than 200 years!).

For a certain number of years and since 1874² the Florio family also owned the Egadi archipelago in western Sicily and the sea around it, a group of isles off Trapani where some tuna traps were based, including the biggest trap and tuna industry in the Mediterranean Sea, i.e., the tuna trap of Favignana. This impressive industrial site, which has not been active since 2006, was restored just a few years ago and is now used as a museum and a site for cultural events (Quatriglio, 1991; Torrente, 2005; Anon., 2007).

Mr. Vincenzo Florio Sr., senator of the Italian kingdom, Governor of the Court Bank and the richest Italian for many years, was the man who invented the process for preserving bluefin tuna in olive oil.

The name of the main family company was established by his relative and commercial partner, Ignazio Florio, by his testament in 1828 and the devised name was "I. & V. Florio".

The last active members in the tuna industry were the two brothers, Vincenzo Florio Jr. (Palermo, 18 March 1883 – Épernay, 6 January 1959) and Ignazio Florio Jr. (Palermo, 1 September 1869 – 19 September 1957), sons of Ignazio Florio Sr. and the baroness Giovanna D'Ondes Trigona.

Vincenzo Florio Jr. had many cultural and social interests and a clear international attitude; he was first married to Princess Annina Alliata di Montereale and later to Lucie Henry, a French model and artist. He was also an artist and painter. He developed the wine industry, but he was mostly an international traveller and a passionate of cars and motors. He invented an off-road truck able to bring military supplies even on mountains (and for this reason was successfully used in the WW I) and who established the world famous "Targa Florio" race in 1906. He was also a race car driver and he participated in several car races. He established the Sicilian Automobile Club and founded a car factory, which never produced any car, although some cars were marketed under the Florio trade-mark (but produced by Officine Beccaria in Turin). He also established the "Circumnavigation of Sicily" boat race, horse races in Palermo, aerial shows in Sicily, air races and motorbike races.

Ignazio Florio Jr. was a man of many interests who spoke several languages. He lived a very intense life, was married to the baroness Franca Jacona della Motta di San Giuliano Notarbartolo di Villarosa (who pertained to the family having the title of "Grande de España"). However, his personal family life was complicated by his attitudes, while his social life was extremely intense and at the highest level at that time. He managed many activities, further developing the wine and spirit varieties and products of the family's firm, as well as the most important theatre in Palermo. His objective was to improve the international visibility of Sicily, bringing there also capitals from other parts of Europe and promoting its image with several industrial and cultural initiatives. Ignazio Florio Jr. had an incredible capacity for promoting initiatives. One well-known example is the invention

² The Egadi Islands, the sea around them and the tuna traps located there were acquired by Senator Ignazio Florio from the marquis Pallavicino Rusconi on 7 March 1874.

of an easy system to open cans, the key-wind system, invented by the local administrator of the Florio's tuna factory in Favignana, Mr Gaetano Caruso. This innovative project was developed earlier in Favignana, under the ownership of Ignazio Florio Sr. This very practical invention was later officially registered and presented at the National Exhibition in Palermo in November 1891, strongly promoted by Ignazio Florio Jr. Lledó Martín (1943) was not aware of this Italian innovation and reported in his book that the first key-wind can opening system was made in Spain, under the brand "Figaró", produced by the Bassó canning company in 1939.

Unfortunately, the main economic activity where the Florio family had important shares, the naval company "Navigazione Generale Italiana (NGI) – Flotte Riunite Florio e Rubattino", which owned more than 100 ships at a certain stage and which was one of the biggest in the world, was at the end the main cause of Florio's economic problems. As a result of these problems, almost all family's properties were lost in the early part of the XX century. However, Ignazio Florio Jr. avoided the complete failure and maintained a few properties for himself.

Florio's family, over the many years of the family history, owned five luxury yachts and three of these in particular (Sultana, Mary Queen and Aegusa) were very famous for their top-quality features. One of them was used several times by Ignazio Florio Jr. to travel to the Canary Islands, where he developed some economic activities in the early 1920s. However, information about these activities is extremely scarce, even though it is known that he did own a banana factory, and exported fruits to Europe, and also a nice house and a tuna factory.

Mr. Florio was not the only Italian who traveled to Spain to develop the salting and canning industry. Between the end of the XIX century and the beginning of the XX century the history of several Italians who went mostly to northern Spain to set-up innovative canning industries, is well known. Another Sicilian family, the Orlando family, who were from Terrasini, close to Palermo, developed a fish cannery in San Sebastián in 1922 and the Orlando's production still exists in Spain (under the name Conservas Olasagasti in Markina, Bizkaia), and still exports also to Genova, Italy. Some canning activities (those related to agriculture products) of the Orlando family were moved to the La Rioja area in 1961 and then were sold (with the trade mark) to the Heitz group in 1988. Other Italians (Brambrilla, Cefalú, Cusimano, Giannitrapani, Maccione, Mazzara, Olivieri, Sanfilippo, Tarantino and Vella) developed canning industries for small pelagic species in various coastal towns (Santoña, Laredo, Colindres, Castro Urdiales, Bermeo, Ondárroa, Zarauz or Guetaria), mostly exporting their products to Italy (Genova, Livorno and Naples) (San José, 2007). Two of these families (Mazzara and Olivieri) are still active in Santoña (Cantabria), and still exporting salted fish mostly to the great market of Genova (Italy). Mr. Giovanni Vella Scataliotta, also from Trapani (Sicily) developed locally the typical production of anchovy fillets in oil, which considerably changed the Spanish canning industry since 1883. The history of Italian families that developed the fish salting and canning industry in northern Spain is well documented by Escudero Domínguez (2005, 2007 and 2012) and Gutiérrez Bicarregui (2002). Another Italian company, Mario Novaro Parodi, arrived in 1860 in the Canary Islands from Genova, and a good description of its oil canning activity in La Gomera is provided by Anon. (1927 and 2013b).

This paper provides information on the tuna fishery and the tuna industry managed by Florio in the Canary Islands, a story unknown in fishery science up to now.

2. Background information

A significant part of the economic activities of Florio family was always centered on the tuna industry, which was based mostly in the tuna traps in western Sicily and in the Egadi Islands in particular (mostly in Favignana, but also in Formiche). These traps provided tuna meat to the Florio factory based on the island of Favignana, which was canning in oil, salting in barrels, and also preparing several other products for the markets (with special attention to the top-quality products). This Florio factory was the most important tuna producer in Italy and Europe for many years. The Florio's tuna productions were able to achieve the highest international awards in the major International exhibitions in the second half of the XIX century.

At the end of the '10s, Florio's tuna commerce suffered from the competition caused by the lower prices of tuna products from Spain (and even from Tunisia), where bluefin tuna, marine salt and oil had lower costs compared to Italy. Furthermore, the Spanish traps located along the Atlantic Moroccan coast and off Spain's mainland close to the Straits of Gibraltar were catching bluefin some weeks before the Sicilian traps, which increased the competition between the tuna Spanish industries and the Italian ones. As a result, the economic activities related to tuna production of the Florio family were reduced in the first decade of the XX century.

At a certain point, perhaps supported by good and reliable local information, the Florio's decided to initiate an activity in the Canary Islands. The rationale behind the decision was to catch bluefin tuna in advance compared to the several Spanish traps in Morocco³ (Anon., 1927b and 2012a), also taking advantage of a local production of cheap marine salt and the availability of cheap olive oil (possibly, the oil was imported directly from Spain, taking advantage of the special regime of reduced taxes in the Canary Islands). Furthermore, all local costs were extremely low compared to those in Italy and even to those in continental Spain.

There is a factor which makes the timing of this decision somewhat intriguing: many studies on bluefin tuna in this area were conducted in the '20s by Fernando De Buen y Lozano (1922, 1923a, 1923b, 1923c, 1925, 1926a, 1927a, 1927b, 1927c, 1928, 1931), while, in these same years, Odon de Buen was studying bluefin tuna in the Spanish areas (1920, 1924a, 1924b). In particular, Fernando de Buen y Lozano was the Head of the Biological Department of the Spanish Institute of Oceanography at that time. Spain, in those years, had many interests in developing fisheries in the areas between the Strait of Gibraltar and the Canary Islands (the Ibero-Moroccan area), but particular attention given to the bluefin tuna in an area where this fishery was not officially so relevant raises some questions about the real motivation behind all these very important scientific investigations.

Knowing Mr. Ignazio Florio Jr.'s well-established custom of having all the necessary background information before initiating a new activity, it is possible that he, and maybe other industrialists operating in the Spanish tuna fishery sector, in some ways promoted or supported at least some of these investigations, with the objective of better evaluating the economic risks. As a matter of fact, there is an important coincidence in timing between the investigations carried out by Prof. Fernando de Buen y Lozano and the initial phase of Florio's activities in the Canary Islands.

Anyway, the bluefin tuna fishery already existed for many years in the Canary Islands and the extremely detailed work carried out by Mesa Martín (2003) provides a precise description of the tuna fishery since 1832. These old activities are not included in the reviews made by Aloncle (1964), Santos Guerra (1976, 1977) and by Delgado de Molina *et al.* (2014), as all these included more recent bluefin tuna fisheries in the Canary Islands; the detailed national review made by Lledó Martín (1943) does not specifically reports the bluefin tuna fishery in the Canary Islands. Perhaps the extensive confusion about the many tuna species caught in the area, always reported as tunas, is due, in part, to this lack of historical information.

The Canary Islands were not unknown to Ignazio Florio Jr., since some of his ships usually stopped in Canarian ports along their courses, transporting goods and sometimes even passengers. Hence, he decided to establish a fish factory in Tenerife and also to buy (or build) a nice simple house close to the shore, where he spent some time during several years. The photos of the factory and of Ignazio Florio in Tenerife were kindly provided by the archives of Paladino Florio and the Successors of Enzo Sellerio Editore; they were previously published by Giuffrida and Lentini (1985) (**Figures 1, 2 and 3**); these photos show clear evidence of the activity in Tenerife, but all other details were missing.

Besides the extensive study carried out by Delgado de Molina (2011) on the historical bigeye tuna fishery in the Canary Islands, the tuna fishery in this part of Tenerife was mostly studied by ethno-anthropologists or historians who were able to collect information from very old times, including sometimes those from Florio (Galván and Pascual, 1989; Mesa Martín, 2003; Pérez Barríos, 2003). As mentioned above, the main problem of many old reports is the undefined species concerned, as all species were often grouped together and reported as "tunas" and these were very rarely separated by species.

Following a partial economic crisis in the Canary Islands archipelago, due to the increasing international concurrence in the wine and spirit markets, the local economy tried to explore new activities. According to recent papers (Mesa Martín, 2003; Pérez Barrios, 2003), the tuna fishery in Tenerife and La Gomera had a particular development between the XIX century and the first part of the XX century. In 1831 an Italian industrial, Francesco Grasso, from Genova, obtained the royal privilege for fishing and salting tuna and established a factory on the beach of La Gomera. The first production of 40 "pipas"⁴ was exported in 1832, followed by a sudden increase in the following years (187 pipas in 1833, 744 pipas in 1834 and 1835, 432 pipas in 1836 and 1837). Mr. Grasso died in 1837 and, with him, the royal privilege ceased and the activity was freely available.

³ This rationale implies that Florio was fully aware of the bluefin tuna migration routes in the Ibero-Moroccan area and their timing. He was also clearly aware that many bluefin tunas were moving from the area between Tenerife and La Gomera towards the Moroccan coast.

⁴ The report includes both "pipas" and "toneles": both terms were used for wooden barrels; it is quite difficult to estimate a weight, because it varies according to the contents. The reference about "toneles" included in the *Diccionario Marítimo Español* (Anon., 1831), reported as equivalent "toneles" and "tons", but then the reference about "pipas" does not seem to correspond. Lledó Martín (1943) reported that one "pipa" was equivalent to 400 kg for salted tuna and, according to this conversion, the quantities should be 16 t in 1832, 74.8 t in 1833, 297.6 t in 1834 and 1835 and 172.8 t in 1836 and 1837.

According to Mesa Martín (2003), the main development of tuna salting factories in the Canary Islands occurred between 1837 and 1838: Grasso⁵ y Ravina in Las Canteras, Juan Tugores in Playa de la Rajita, José Mila y Grao y Compañeros (from Huelva) in Playa de Erese, León de León in Playa de Argaga, Roldán and Borrás in Playa de Santiago, Manuel de Foronda in Villa de San Sebastián, Juan Blanich y Compañía in Playa de los Cristianos (Island of Tenerife) and Juan Cumella (from Barcelona, but he developed his tuna industry in Isla Cristina) (Guimerá Peraza, 1999) in Playa de San Juan (Island of Tenerife). Another six factories, established in the same year, were all based in Barranco de Tazacorte (Island of La Palma): Salvador Romeu, Juan Ballester, Antonio Bosch, Miguel Oliver, Tomás Felipe de Acosta and Dominguo Acosta.

In the following years, the tuna production in the Canary Islands increased considerably, reaching a peak of 2569 pipas (1,027.6 t) in 1851. The industrial activities were supported by a diffuse fishing activity, which involved many vessels (either for the fishing activity or for transport) and up to 800 crews, and also 170 families employed in the factories. The high taxes imposed in 1851 and the need to import salt from other islands⁶ suddenly created an economic crisis of the tuna industries in the following years. This tuna industry crisis occurred in parallel with the “cochinilla”⁷ production, creating a serious economic problem in the Archipelago.

The tuna industry in the Canary Islands was partly resumed between the two centuries. In Tenerife, the eruption of Chinyero volcano in 1909 induced several local tuna fishermen to move to the front island of La Gomera, in Playa de Santiago, where some tuna factories were based. Other local fishermen, at the beginning of the ‘20s, developed a fishery for other species, using large boats able to fish and carry up to 30 tons. In the following years, most of these fishermen worked for the factory established by the Italian Company “F.lli I. & V. Florio”.

3. The Florio’s tuna fishing and factory activities in the Canary Islands

The first problem in the investigation of the Florio’s activities related to bluefin tuna in the Canary Islands was linked to the time period covered by those activities, because some well-documented Italian books (Giuffrida and Lentini, 1985; Cancilia, 2008; Li Vigni, 2013) reported misleading dates. This problem was caused by the very incomplete documents available in the various archives in Italy and also by the correspondence by Ignazio Florio Jr. himself, who wrote partial and misleading details for personal reasons⁸ (Cancilia, 2008; Marasá, 2010). Due to the very uncertain dates, it was decided to firstly identify the location and then try to find any available document.

The investigation to properly identify the tuna fishing and tuna factory activity in Tenerife has been complicated by the fact that some of the stories about Florio’s family reported that Ignazio Florio Jr. had “a tuna trap” (“tonnara” in Italian) in the Canary Islands, in Tenerife (Marasá, 2010). Again, this misleading information did not fit the available knowledge about the distribution of tuna traps in the Atlantic (see Anon., 2012a) and the morphology of Tenerife made it difficult to understand where a tuna trap could be set. Furthermore, a tuna trap needs large land-based facilities for both nets and vessels, which are usually detectable even after decades and the exploration of all the coastal line of Tenerife, carried out with the help of Google Earth© did not reveal any site. In addition to the physical facilities, usually a tuna trap has hundreds of people working at the trap site, thereby developing a specific culture which is passed on in many ways and detectable in local stories and traditions after many decades and even this cultural element was not there. Furthermore, tuna traps in Spain (“almadrabas”) were annually and specifically regulated by the Spanish national authorities (by “Boletín de Pesca” and “Reglamento de Almadras”) but it was not possible to find any reference to any trap in the Canary Islands in the ‘20s and even after.

Consequently, it was supposed that in this case the reference to a “tonnara” (which is still reported by some papers, Anon., 2013a) was technically wrong and this term was improperly used for generally reporting a different fishing method for tunas or a site where tunas were preserved in some ways.

⁵ Mr. Grasso was the successor of Don Francesco Grasso.

⁶ Usually, those industries used the salt produced in each island where they were based, but the increasing production created a shortage in local salt resources and then it was necessary to import salt from other Canary Islands, at higher prices, which reduced the benefits to a minimum.

⁷ The “cochinilla” was one of the main productions in the Canary Islands in the middle XIX century. The insect *Dactylopius coccus*, a parasite, was farmed and used to produce a red colour (“carmin”, now known as E-120), important for textiles, cosmetics, food and wines; the Canary production is considered as a top-quality one.

⁸ According to several books and particularly to the detailed reports by Marasá (2010) and Li Vigni (2013), Ignazio Florio Jr. was quite often in Tenerife with the most important of his lovers, the countess Vera Arrivabene, and then he had several reasons for partly justifying these travels to of his wife.

Another problem was caused by the fact that several reports concerning the fishery in the Canary Islands, including many details on the tuna fishery and industry, did not mention this factory at all (Pascual Fernández, 1991), while even the Spanish colleagues working in the IEO Laboratory in Tenerife were never aware of this factory.

At the beginning of this investigation it was extremely difficult to locate the Florio's factory and the tuna fishing activities in Tenerife, because almost all documents available from the archives concerning Florio activities did not include any reference to the precise location. Furthermore, some old documents and reports generally reports "Canary Islands". An initial in-depth analysis was made in the Historical Archive of the "Banca Commerciale Italiana" (now identified as Historical Patrimony of Banca Commerciale Italiana in the Historical Archives of Banca Intesa in Milan⁹), the major financial support of Ignazio Florio jr. and the Florio company in those years and even the bank which later on took-over and managed many activities of Florio when his economic situation became unstable and problematic. The quantity and quality of documents which were provided by Ignazio Florio Jr. to this bank are incredible as are the many documents the bank was able to collect during the various procedures in evaluating loan requests by Florio. Such information is able to give us an inside view of the seriousness of the analyses required even at that time to provide funding to companies.

The key to learning the location of Florio's activities in Tenerife was provided by the information that he was named Italian Consul in Santa Cruz de Tenerife in October 1926 (Anon., 1926)¹⁰. Following this solid track and thanks to the Italian Consuls in Las Palmas and Tenerife, it was finally possible to find the effective location of Florio's factory. At the same time, it was possible to recover the detailed information provided by Mesa Martín (2003) and Pérez Barrios (2003), also partly included in a recent thesis (Rodríguez Henriques, 2012), which was almost unknown to tuna and fishery scientists so far, confirming the exact location.

As a matter of fact, the Florio's factory was located in the southwestern part of Tenerife, in Playa de San Juan, municipality of Guía de Isora (**Figure 4**).

In August 1924 the Florio's factory initiated its activity, after buying and refurbishing some old storages facilities and factories that already existed in Playa de San Juan since the XIX century; it is possible that these buildings were the old factory of Juan Cumella, established in 1837 (Mesa Martín, 2003). Some of the preserving activities also took place in natural caves close to the shore (**Figure 2**), but these caves were used mostly for salted fish in barrels. Furthermore, in the same area it was possible to get natural marine salt, initially keeping this cost component at a low level. A "salina"¹¹ was active for many years in the Playa de San Juan, created by a local marine water source and a small volcanic geyser. Florio had also a private house in Playa de San Juan (located in the property of Trujillo, not better identified), maybe two floors with a veranda and a small outdoor terrace; it was very simple but nice, with paintings on the walls possibly done by Lucie Henry, his brother's second wife; this house also hosted some other members of the family from time to time.

It is not very clear if the Company only purchased tunas and other species from local fishermen or if it also fished directly with some fishing vessels owned by them. However, the latter hypothesis seems more in line with available evidence. The extremely scarce information available seems to indicate that many local fishermen worked for the Florio factory, selling tunas caught by hand lines and small boats, and at least three mid-water trawl vessels also supported the production; the ownership of these vessels is very unclear, but it is very possible that Florio owned some of them¹². According to Anon. (1927) and Ríos Jiménez (2006), "trowlers" were used to catch bluefin tunas in the same area in 1925, providing fish to local factories; this transcription is clearly erroneous, since Mesa Martín (2003) correctly reports "trawlers", and the activity of these vessels is another coincidence.

⁹ The specific folders of the archive are identified as "BCI-SOF163", "BCI-SOF375.6" and "BCI-SOF303.5".

¹⁰ Ignazio Florio was named Italian Consul in Tenerife on October 20, 1926, but resigned shortly thereafter in 1927, due to some legal problems caused by his economic activities on site.

¹¹ Salina de Fonsalía, owned by the family Barrios de Guía. The salty geyser was called Bufadero de Fonsalía and it does not exist anymore, because it was destroyed and covered by buildings. Other additional "Salinas" were built in the '30s in Playa de San Juan, more close to the Florio's factory, and they were owned by Antonio Meneses.

¹² Pérez Barrios (2003) reports that in 1924 Ignazio Florio brought two small steamer vessels and a car to Playa de San Juan. No further description about the characteristics of these vessels is available and not one of them is listed among the Spanish motor vessels at that time. It is possible that these vessels still had an Italian flag.

As concerns the hand-lines used by the local fishermen to catch tunas, the description is provided again by Mesa Martín (2003). Local fishing vessels measured between 5 and 7 m, using sails or oars or both, and had a crew from 3 to a maximum of 8. The hand-line, called “cordel”, had between 80 to 100 branch lines, varying their thickness according to the season. Each branch line had a length of about 45.72 m (25 “brazas”) and was equipped with a strong iron hook (maybe they used also steel hooks). Each vessel used between one and three “cordels”, usually one from the bow and another or two from the stern. The bait was always mackerels that were fished daily at sunrise by each vessel. Each fishing trip lasted from 8 to 10 days, depending on the size of the vessel and the fishery. Tunas were always landed in the evening, usually directly on the beach in front of the factories. At the beginning of the ‘20s, the first price for tunas was usually between 0.12 and 0.20 pesetas per kg, with lower peaks at only 0.05 pesetas per kg. The prices increased in 1924, due to the increasing demand from the two factories in Playa de San Juan and in Playa de Santiago, reaching a level between 0.36 and 0.38 pesetas per kg.

The average amount of fish canned or salted by the Florio factory at that time was about 7 metric tons per day, quite a considerable amount. The Florio’s factory in Playa de San Juan produced not only bluefin tuna, but also other tuna species, mackerels, sardines, anchovies, escolar and other fish species (the latter reported under a common commercial name of “dentici”¹³). The details of all these products are not available, while the salted sardines are well documented by some photos from the archives of Florio Paladino (Giuffrida and Lentini, 1985). It is sure that Florio also produced and exported canned bluefin tuna in olive oil.

Mesa Martín (2003) provides a description of how the bluefin tuna were prepared for canning in oil: landed fish were weighted and registered then, after draining out the blood, the fish were washed in large wash-tubes (“chancas”); the tunas were then gilled and gutted, and the heads were removed also and then they were cooked in salty water. The cooking of the tuna was the most delicate part of the preparation, because the final taste and meat texture depended on it. Then the meat was dried in the shadow, in well aerated places, fully cleaned and cut in pieces; after a further selection, the meat was put in cans already partly filled with olive oil, which were later sterilised in autoclaves, for final sealing.

This production was made possible by many local workers (about 100 people, both males and females), who earned very low salaries (5-6 pesetas/day for the men and 2.25 pesetas/day for the women), lower than in other fish factories in the Canary Islands at that time¹⁴. The life style of Florio’s workers in Playa de San Juan was very poor, particularly because the living facilities there were extremely reduced and some women who came from other areas of the same island or from La Gomera usually all slept together in local caves.

Notwithstanding, the development of these fishing and preserving activities by Florio in Playa de San Juan was economically and socially very important for the local community and even for the fishermen based on the nearby island of La Gomera. Furthermore, to compensate for the low salaries but certainly following the Florio’s well-known attitude in the tuna industry and trap on the Island of Favignana, the Florios provided many additional social services to their workers and fishermen, including local dedicated medical assistance, a school for the children of the workers, a chapel and some meeting rooms. All workers at the factory (except the fishermen) had accident and industrial insurance. This type of social support was certainly innovative for the local industries and was deeply appreciated by Florio’s workers. Whilst there is information on the harsh living conditions, there is no information about any claim from these workers for the low salaries. Furthermore, it is also possible that, following the same tradition existing in their Italian facilities, Florio provided some food supplies and a minor part of the fish products to the workers.

This special attention to social support for their workers created problems for other fish factories based in the Canary Islands, particularly a factory based in Santa Cruz, “la Virgen de Candelaria”, owned by Bernardo Barrera y Compañía, and the factories based in La Gomera, which were induced to consider the social aspects of the contracts for their workers, even though it seems that previous labour conditions were not improved.

Florio’s activities in their initial phases in Playa de San Juan and in the Canary Islands are extremely unclear. Most of the Italian books on Florio do not report that the activity was initiated in 1924 (the usual reported year is 1925) and Ignazio Florio Jr. personally wrote somewhat misleading letters to his wife Franca in 1925, saying that it was impossible to find tunas in the Canary Islands, that he was canning sardines and thus it was necessary to save money at home (Cancilia, 2008). On the contrary, Marasà (2010) reported that the first year of activity of the Florio industry in Tenerife was extremely good and the amount of bluefin tuna they had was so high and concentrated in time that it was impossible to preserve, salt or can all the fish. Hence, the excess tunas were discarded at sea, attracting many sharks which remained in the area for long time; the presence of these sharks hampered the fishery in the following months (Marasà, 2010), but it is not clear when their presence decreased.

¹³ Under the commercial name of “dentici” (snapper), Florio included several white-meat fish species (snappers, shi drum, meagre, groupers, escolar, common pandora, blackspot seabream, gilthead seabream, red scorpionfish, and other species).

¹⁴ Other Canarian fish factories, in the same years, were paying salaries between 8 and 12 pesetas.

Information about the size frequencies of bluefin tuna which were caught and canned under the Florio's activities is simply not available, and this is again unusual for the Florio's industrial habits¹⁵. According to Mesa Martín (2003), this fishery targeted lower quality bluefin tuna ("barrilotes") in cold months, weighting about 16 kg, and top-quality bluefin tuna in warmer months, weighting even more than 200 kg. One of the tuna fisherman who also worked for Florio at that time, Antonio González García, nicknamed "Cho Antonio el Calanero" (**Figure 5**), caught a bluefin tuna that weighted over 400 kg (Brito, 2010).

Anecdotal information reports that Florio's factory in Tenerife exported in the first years large amounts of canned tuna to Italy, possibly over 1,000 tons in one year¹⁶, loading the cans directly in Playa de San Juan or moving them to La Gomera and then exporting them directly to Italy. It is not clear if this quantity was produced only by Florio's factory or if the export to Italy included products from other factories in La Gomera. The transport was organised by Florio thanks to his fleet and the strong connections with other shipping companies. According to the information collected by this investigation, it is certain that Florio also used his vessels to export canned tuna from Tenerife and La Gomera to Italy, but the only evidence is provided by the motor vessel "MIO"¹⁷ which sank during a storm on the night of 26 November 1925 in Playa de San Juan; according to a Spanish confidential report, this vessel usually navigated from Playa de San Juan and Santa Cruz de Tenerife and its accident created several legal problems for Ignazio Florio Jr. In other cases, Florio used ships belonging to other companies to export canned products to Italy.

It seems that the Florio's factory in Playa de San Juan had good revenues in these initial years, but the only evidence is provided by the budget of the local municipality (Guía de Isora) in 1925, for the years 1925-1926, which levied local taxes for the company at a high level, 1,000 pesetas (Pérez Barríos, 2003).

These years were very important for the development of the tuna fisheries in the Canary Islands: Mario Novaro Parodi, who initially established a fish factory in Arguineguin (Gran Canaria), later established another factory in La Cantera (La Gomera). Lloret and Llinares initially established a fish factory in Mogán (Gran Canaria) and later another one in La Rajita (La Gomera), the latter specialised in salting bluefin tuna and bonitos. This factory in La Rajita was remodelled and enlarged in 1926, also adding a modern canning factory and an ice plant; the tunas were also provided by trawlers. Another factory ("Salazones y Conservas de La Gomera") was established in the '20s by López y Compañía in Playa de Santiago (La Gomera). Bendala Palacios (1926) provided a detailed overview of the tuna activities in La Gomera; further information is provided by a recent work by IES students in San Sebastián de La Gomera (Anon., 2012c). Rial (1935) mentioned the Florio's factory in Tenerife when he visited the islands in 1926.

It should be noted that 1921 was an important year for maritime transports in Tenerife, the project for the new port in Santa Cruz was developed at that time. In the same year, Álvaro Rodríguez López, the most important Canarian shipowner in the first part of the XX century, acquired two new steamer vessels, "Santa Ursula"¹⁸ and "Sancho II"¹⁹; in 1929 Rodríguez López established the Compañía Canaria de Cabotaje in Santa Cruz de Tenerife, owning more than ten vessels (Díaz Lorenzo, 2010a and 2010b). Their usual routes included Santa Cruz de Tenerife, La Gomera, Las Palmas de Gran Canaria, Ceuta, Melilla and various Spanish continental ports. At least two of these ships, "Santa Ursula" and "Sancho II" (**Figure 6**) were used several times by Florio to export his fish products from Playa de San Juan.

Perdigón Díaz (2012) reports a third ship, "Amelia"²⁰, as belonging to the same company and transporting cans in Playa de San Juan, but it was not possible to find any further local evidence about this ship, also because it was not on the list of the vessels owned by Rodríguez López. The only transport ship "Amelia"²¹ listed by Bolado (2012) was a vessel owned by Artaza y Compañía S.A., constructed in 1918, acquired by the company in 1926 and sold again in 1929, then renamed "Ricardo Espinosa".

¹⁵ All traps belonging to Florio family and their factories based in Italy kept due tracks of the production, registering at least the number and weight of fish caught yearly. According to Mesa Martín (2003) this also occurred in Tenerife, but all these registers were lost.

¹⁶ This considerable quantity (equal to a total catch between 1,930 and 2,346 t) not only fits well the production capacity of the factory and justified the high number of staff working there, but also the large number of fishermen working in that area.

¹⁷ So far it has been impossible to find any record of this vessel among those owned by Florio and registered within the "Società Navigazione Italiana"; it is possible that "MIO" was a small motor vessel, directly owned by the Florio Company based in Tenerife. It is not on the list of the Spanish motor vessels in the last 100 years (Bolado, 2012).

¹⁸ The "SV Santa Ursula" was completely destroyed by a fire on board in January 1932 in Tazacorte.

¹⁹ The "SV Sancho II" (41.75 m and 375 tons) had a long life, survived to the time of WW II and navigated until 1969.

²⁰ A small motor vessel, "Amelia", (15 m, with a motor of 50 hp) which operated between SW Tenerife, Santa Cruz and La Gomera, and was owned by Miguel Castellano Pérez y Amelia de la Cruz Fariña, was used both for fishing and transport, was built quite some time later, in 1940.

²¹ This vessel was 24 m and 160 tons.

In 1925 the Florio's encountered their first serious competitor, as Serafín Romeu y Fages, Count of Barbate, who was the owner of many traps and fish factories both in Spain and along the Atlantic Moroccan coast, decided to establish a new factory in San Sebastián de La Gomera (in a place called "Torre del Conde"), just in front of Playa de San Juan and the Florio's factory. The director of this new factory was Manuel Bendala Palaciós, a very capable man, and they began the activity only with a salting plant, for several fish species to be exported to the Spanish mainland. After only 5 months, they decided to enlarge the factory and open a canning plant.

Initially, both companies purchased the fishing vessels in La Gomera, at increasing prices, and they also promoted the construction of new fishing vessels starting in 1925. After only one year, the total number of tuna fishing vessels in La Gomera reached 120 units (Mesa Martín, 2003). No mention is made about the factory owned by another Italian, Mario Novaro Parodi in La Cantera (La Gomera) and how this factory interfered with the other two competitors, but according to the local press at that time (Anon., 1927a), the tuna factory was working at high levels, also canning tuna in olive oil²².

The increasing number of factories and the consequent increasing demand of tunas in this part of the Canary Archipelago caused a remarkable increase in the prices: in April 1926 the first price was between 0.50 and 0.53 pesetas per kg, and in May it reached 0.60 pesetas per kg. At the same time, the demand for local salt further raised, causing an increase in production costs for all companies.

In 1929, according to some documents provided by the Archives of Banca Commerciale Italiana²³, it is clear that Florio faced serious financial problems with the activities in Tenerife and apparently the factory was not operational for "some years"²⁴. The Bank had no details about the fishing equipment or the factory tools existing in Tenerife and negotiated an agreement with another Italian company, (Società Anonima Coen from Genova) to carry out the activities. Mr. Coen also proposed to buy a powerful midwater trawler of 55 m (about 750 tons), equipped with deep refrigerators on board and machines to produce fishmeal directly at sea, able to provide between 100 and 150 tons of various fish species per month to the factory. The plan was to have bluefin tuna products for 6 months and then other species (small pelagics and "white fish") for the remainder of the year. Mr. Coen provided a very detailed description of all technical and financial needs, based on a previous project in Las Palmas, which should be integrated by the Florio's factory in Tenerife. However there are no other papers on this agreement. Following the economic difficulties, the lawyer of the company in Tenerife, Pedro Ramírez Vizcaya, requested a reduction of the tax level from the Municipality of Guía de Isora, which was refused.

For sure, in 1931, the relevance of the tuna fishery in the area induced Álvaro Rodríguez López to build a factory in Playa de Santiago, in La Gomera, which was under the brand "Santa Rosa de Lima"; many species were canned here, including bluefin tuna, and he owned a fishing fleet of 20 vessels (between 3 and 4 t each), 6 falúas (between 50 and 70 t each) and two transport ships. This factory increased the local competition with Florio. Santa Rosa de Lima was active for about 50 years.

All other documents²⁵ from the following years (1932 to 1934) include many reports on the quantities of bluefin tuna imported from Spain, although it was not clear if those quantities were provided by the Florio activities in Tenerife or if they were provided by other international dealers. Furthermore, many documents refer to contacts with the Spanish Authorities for some custom protection, while the Italian government was increasing the customs rights for canned Spanish tuna from 20 to 40 Liras per 100 kg. The report, dated 5 July 1932, clearly mention that the high quality production of "Tonno Extra", which was based on tuna directly "experimentally" produced by the Florio company and imported from Spain was getting high prices on the market; in the same report, it is clearly mentioned that the Spanish fishery was carried out just before the Italian fishery and that it was necessary to ensure a stability for the workers in both countries. In another report, dated 2 June 1932, it appears that the Florio Company sub-contracted a small Italian company, S.A.P.R.I., to fish and transport bluefin tuna from Spain to Italy, for a minimum of 200 tons per year. According to the official budget of Società Anonima Tonnare Florio in 1932, the special production of canned tuna ("Tonno Extra") originated from Spain (possibly including the production in Tenerife) was still generating economic benefits equal to about 35% of the total production costs for this bluefin tuna.

It is quite curious that all the Company's official budgets available for 1931, 1932 and 1933 never specifically mention any activity in the Canary Islands, while they include benefits and costs in general for Spanish tuna.

²² The factory owned by the Parodi family in La Cantera was active until the early 1960s.

²³ Letters in folder "BCI-SOF163" from May 8 to July 3, 1929.

²⁴ It is not clear if the economic difficulties were caused by a shortage of tunas or by other factors, because reports and registers are missing. At any rate, there is no local evidence of any lack of activity by the Florio factory in those years.

²⁵ Archive "BCI-SOF303.5".

On the contrary, in the comprehensive audit report in 1934 (including tables from 1929 to 1932), the Auditors clearly included losses²⁶ for the Florio company in 1930 for the “Experiment for bluefin tuna in the Canary Islands”. According to the same audit report, it seems that the bluefin tuna was fished in the Atlantic from September to December, but this information does not match what we know about the fishing season in the Canary Islands. The same report (on its page 17) includes the quantity of bluefin tuna caught in the Atlantic²⁷ and canned in oil for the last three years, 1931-1933. On page 23, for the first time, there is a quantification including the details of the bluefin tuna imported from the Atlantic and produced by Florio, for the year 1930-1932 (**Table 1**). These data, extrapolated to the total production according to the conversion factors used by the Barbate trap at that time, provide further information about the quantities of fresh tuna caught in the Canary Islands and traded by the Florio Company in those years; if we use the conversion factor from the Florio factory in Favignana (possibly the best bluefin tuna factory at that time), the quantities of total fresh bluefin tuna are much lower; however, it is not clear which conversion factor should be used for this bluefin tuna production. According to the audit report, the economic benefits generated by this specific Atlantic production were about 34.92% of the cost, representing an economic margin of 13.33% of the final selling price on the gross market, including the general costs in the total production costs.

The same audit report specifies that other Atlantic fish (snappers, shi drum, escolar, meagre, groupers, common pandora, blackspot seabream, gilthead seabream, red scorpionfish, and other species) were canned in oil by Florio. This additional production was able to generate high economic benefits, equal to about 48.57% of the production costs.

Cadenas del Mar (1934) reports about a very large quantity (1,000 tons) of canned bluefin tuna exported directly from La Gomera to Italy in 1933, avoiding any passage through mainland Spain; this amount is reasonable when compared to **Table 1**, but it is not clear if it was sold to Florio or if it includes Florio’s production. According to this paper, the fishermen who made these catches were based in San Sebastián de la Gomera, Playa de Santiago y Valle del Gran Rey; the number of fishermen was not mentioned. The amount paid by the local factories for the tuna ranged between 0.7 and 0.8 pesetas per kg²⁸, a price higher than usual due to the competition among the local factories: Escobio, la Almadrabra, Lloret y Llinares and Mario Novaro. The paper reports that in 1934 bluefin tuna and albacore fisheries were seriously affected by the predation by big marine mammals²⁹; it is clear that the lower tuna catches impacted also on Florio’s activities. As concerns Tenerife, the same paper reports the presence of 43 fishermen in Playa de Alcalá, just a few kilometres north of Playa de San Juan, the place where many fish caught in La Gomera were traded, but the Florio factory is not mentioned in any section of this paper. In the same year (Mesa Martín, 2003) the “Pósitos de Pescadores³⁰” were established in Alcalá and even in Playa de San Juan. The serious tuna fishery crisis after 1933 reported by Cadenas del Mar (1934) is confirmed by Mesa Martín (2003), who also reports the strong impact of this crisis on local fishermen and workers. Due to the chain of closings of several fish factories in the area, and considering that salted or canned tuna had a final price of 5 pesetas per kg (an increase of 615% compared to the first price!), local fishermen decided to trade the tuna on their own. This was not easily possible, because it was necessary to have a factory and the money put aside in the last couple of years was not sufficient, even if it was increased by funds and a building generously donated by Álvaro Rodríguez López.

Mesa Martín (2003) reported that fishing, canning and salting activities in Tenerife of the Florio family ceased before 29 November 1935, when the factory was acquired by Lloret y Llinares S.A., one of the most powerful Spanish fishing and salting companies at that time.

²⁶ The auditor’s report made by Drs. Migliorisi and Frasca Polara shows the total of costs for the “experiment in the Canary Islands” for 59,227.05 lira.

²⁷ The audit report includes contracts between Florio and another Italian Company, Ditta Capaccioli, for providing bluefin tuna and “dentici” from the Atlantic Ocean.

²⁸ The same paper, on page 6, reports that local fishermen in La Gomera decided to put aside 0.1 pesetas per kg, for the purpose building a “social factory” for the tuna. Mesa Martín (2003) reports that this amount was lower, 0.05 pesetas per kg.

²⁹ They were called “Bufeos”, a Canarian name indicating undefined large cetaceans; they could be killer whales, false killer whales or pilot whales, since all these are tuna predators. Mesa Martín (2003) provides additional details, such as the size (5 or 6 m), but they are not sufficient to identify the species. It seems that such cetaceans usually created problems to local fishermen.

³⁰ “Pósitos de pescadores” are Spanish local fishermen’s organisation, created to improve cooperation among fishermen and included in the Ley 30/06/1887, many times modified in the following years, particularly in 1915-1918. According to the law 14/07/1922 and following modifications, the Spanish State granted these organisation several benefits and tax exemptions; they regularly received subsidies from the State.

When the old Florio factory was acquired by Lloret y Llinares S.A., this company renewed most of the machines, reduced the staff to 30 women and a few men, thus decreasing the total canned or salted quantities to 1/1.5 tons per day. They also decided to eliminate all social supports provided by Florio to the workers. Although the activities of this company in Playa de San Juan are practically unknown over the years, it seems that the factory was active at least up to the '50s (Brito, 2010).

The Spanish Republican Government supported the local fishermen in those years, with the purpose to promote their direct preserving activities for tunas and avoid the Italian intermediations, although because in those times they were only selling tuna to other foreign countries (Anon., 1935-36).

In the following decade, in Guía de Isora, the fishing fleet was comprised of 2 medium motor vessels, 1 small motor vessel and 80 oar vessels. Another tuna factory was established by Álvaro Rodríguez López in the nearest beach of Alcalá, close to the jetty (Pérez Barrios, 2003; Hernandez Armas, 2010). The companies of Lloret y Llinares and Rodríguez López monopolised the tuna fishery in that area in the following years.

4. Some side thoughts about a possible bluefin tuna sub-population in the Ibero-Moroccan area

This fishing activity for tunas and bluefin tuna in the Canary Islands induces some further thoughts about the bluefin tuna movements and behaviours in this part of the Atlantic Ocean. Even though bluefin tuna catches in the '20s and the '30s in the area are not well defined, it is clear that they were not negligible, because otherwise it is difficult to understand why so many tuna factories were established there. Of course, it is very important to consider that not all reported catches were bluefin tuna, while tunas caught in the same area include several other species. Florio (at least in principle) specifically targeted bluefin tuna, because he had to fight the international competition for the trade of this species³¹.

All research carried out by Fernando De Buen y Lozano (1922, 1923a, 1923b, 1923c, 1925, 1926a, 1926b, 1927a, 1927b, 1927c, 1928, 1931 and 1937) confirms that there were many tunas in the area between the Canary Islands, Madeira, the northern part of Mauritania and the Atlantic coast of Morocco, finding many mature spawners; Odon De Buen, in the same years (1920, 1924a and 1924b) mentioned a possible spawning area in the Ibero-Moroccan zone, but his studies were mostly concentrated on the Spanish Atlantic area.

Much later, Furnestin and Dardignac (1962) and Aloncle (1964) carried out extensive surveys in the same area and found bluefin tuna juveniles of age 0, 1 and 2. In a later paper (1966) Aloncle reports juveniles of age 1 off Cap Ghir (Morocco) in September 1964 and age 1 and 2 bluefin tuna off the Madeira archipelago in April-May 1965. It is almost impossible for bluefin tunas born in the Mediterranean spawning ground to reach the southern Moroccan Atlantic coast and the Canary Islands in the same year, since bluefin tuna will usually stay in the Mediterranean at the early beginning of their juvenile life, searching for the right trophic chain in various Mediterranean areas. Lambœuf (1975) tagged age 0 and 1 fish along the Atlantic Moroccan coast, confirming the large presence of bluefin tuna juveniles in the Ibero.-Moroccan Atlantic area. Even if Rodríguez-Roda (1975) did not find any bluefin tuna larvae along the Atlantic Moroccan coast³², he had previously sampled (Rodríguez-Roda, 1964) very young bluefin tuna weighting between 1 and 2 kg along the Atlantic Moroccan coast between September and November, which is the usual age 0 size for these months even in the Mediterranean Sea. In the last campaign, in July, he sampled age 1 fish (2-3 kg) both off Rabat and Safi.

Mather *et al.* (1995), in their comprehensive overview of the life history of bluefin tuna, reviewed all the available information for this eastern Atlantic area, but they concentrated their efforts on the evidence of gonadosomatic indices and the absence of larvae³³, while maintaining the Canarian part of the Ibero-Moroccan area as a potential minor spawning area, along with another one more close to the Strait of Gibraltar. Mather *et al.* (1995), in the same paper, reported all available evidence about the presence of age 0 fish in the Ibero-Moroccan Atlantic area, providing a strong support to the hypothesis of a spawning area in this part of the eastern Atlantic Ocean.

³¹ This target species does not necessarily exclude that other tunas were canned by Florio at the same time, but this is not clear from the label he used on the cans and no species separation is available on any document.

³² The campaign was carried out between the latter part of June and July, because Rodríguez-Roda considered this the usual bluefin tuna spawning period in the Mediterranean; he was not aware at that time of a possible anticipated spawning period in the eastern Atlantic or even in the eastern Mediterranean; he was also not aware of the bluefin tuna movements in May-July in that area recently discovered by GBYP using electronic tags.

³³ A total of 14 bluefin tuna larvae were collected in the Gulf of Guinea in 1963, 1964 and 1965 during the cruises of R/V Geronimo but no other bluefin tuna larvae were collected in eastern Atlantic before or after these cruises (Tashiro, 1980; Mathers *et al.*, 1995).

More recently, Anon. (2011 and 2012b), Piccinetti *et al.* (2013), Quílez-Badia *et al.* (2013a, 2013b) and Di Natale *et al.* (2013, 2014a), again discussed this possibility, taking into account the very recent results of the electronic tagging carried out in the Moroccan traps between 2011 and 2013. These tags, implanted on bluefin tunas migrating northward along the Atlantic Moroccan coast³⁴, unexpectedly revealed that a not-negligible percentage of medium-large bluefin tuna pre-spawners, tagged in May, are not entering the Mediterranean Sea as expected, but they will go in the Atlantic side of the Gibraltar Strait and then some of them will reach the area close to Madeira or the Canary Islands, precisely during the spawning period. This behavior, reported also by Mather *et al.* (1995) from various observations, was also anecdotically confirmed by the “rais”³⁵ who have worked since many years in tuna traps in the Gulf of Cadiz, because they noticed the “unexplainable” catch of spawners in May also from the trap mouth which usually usually catch bluefin tuna when they leave the Mediterranean after the spawning period; the new electronic tagging data provided the explanation for these catches.

Furthermore, even if data on catch level by month are not available for the fisheries in the ‘20s and the ‘30s, the best quality tuna in Tenerife and La Gomera was obtained in spring-early summer and this fits quite well with a spawning presence in the area³⁶. Anyway, at the moment we do not have any clear evidence of a bluefin tuna spawning activity in the Ibero-Moroccan area. As reported by Mather *et al.* (1995), “there is strong circumstantial evidence that bluefin tuna spawn in the Ibero-Moroccan area, but conclusive proof of this is lacking”; whenever we recall the many difficulties for finding bluefin tuna larvae in the Mediterranean, maybe the most “dense” spawning area for this species, then we realise that the lack of larval evidence in the Ibero-Moroccan area might be caused by a research strategy problem.

If there is a (minor) part of the Atlantic bluefin tuna population which usually or periodically spawns in the area between the Canary Islands, Madeira and the southern Moroccan coast along the Atlantic, it could perhaps be a sub-population, but evidence of this is not available at the moment, besides the genetic sampling carried out in the Moroccan traps within the GBYP framework. If this sub-population exists, maybe the intense fishery in the ‘20s and the ‘30s in the Ibero-Moroccan area possibly impacted on it, by reducing the number of individuals for some years, and this fact, together with the considerable mixing of various stock components in this area (Di Natale *et al.*, 2014b), might be the reasons why bluefin tuna juveniles are not always present along the Atlantic Moroccan coast. We should consider, also, that very small bluefin tuna cannot be fished since the adoption of strict ICCAT regulations having a minimum size limit.

From a biological point of view, the existence of a bluefin tuna sub-population spawning in the Ibero-Moroccan area is reasonable, but further research is needed to clarify this old hypothesis.

5. Discussion

This paper is clearly another “cold case” of the exploitation history of bluefin tuna in its large distribution range, but it is also another piece of the undefined puzzle of the natural history of bluefin tuna.

In this case, after discovering the first evidence about the existence of this factory (but, as we reported, other factories were also active in the same historical period in the Canary Islands), the research data were complicated by the strange disappearance of all registers of the Florio’s activities in Tenerife. As mentioned before, this complete lack of detailed information differs considerably from Florio’s tradition of providing information on the tuna industry and traps, whereby all other data are available for many years. Some times such information included the full details about the catches and, when they were not made available to fishery scientists, this was due to the insufficient time and efforts spent to recover them. This unusual situation concerning Florio’s activities in Tenerife is difficult to explain and might apparently be due only by two alternative hypotheses: (1) the Company registers and records were stored somewhere and this place has not yet been detected, or (2) all records were destroyed possibly to hide some economic aspects of the activity. Due to the complete lack of official records, the voluntary misleading letters written by Ignazio Florio Jr. and the very minor amount of information provided to the Italian bank which supported Florio’s activities during these years, the second hypothesis seems more realistic.

³⁴ The massive presence of bluefin tuna along the Atlantic Moroccan coast and in the entire Ibero-Moroccan area, including the Canary Islands, is well known since more than 2,200 years, when the Phoenicians established their tuna traps and salting factories along the Moroccan coast (Anon., 2012a; Di Natale, 2012, 2014).

³⁵ Rais: the arab-origin word for defining the fishery operation manager in tuna traps.

³⁶ The SST in recent years shows potential suitable sea surface temperatures (>20°C) for bluefin tuna spawning in May-June, particularly in the SW part of the Canary Islands, including La Gomera and the southern part of Tenerife. It is not easy to understand if adequate surface water mass and a suitable thermocline are also there.

At the same time, there is a full lack of adequate Spanish statistics about production or export related to the Canary Islands in the same years. The comprehensive report about the Spanish fisheries by Lledó Martín (1943) includes details about the bluefin tuna production from the '20s to the 30's, but it does not report any specific tuna production in the Canary Islands. At any rate, it is possible that at least some quantities might have been included later in the Canary's fishery information in the '40s, when more statistics were available for all areas, but without any clear specific information on the tuna fishery and industrial production in that area. Only in the part of the report specifically describing the industrial sea-food preservation activities is it reported that the Canary salting industries was in third position in Spain in the '40s³⁷, including 1,519 t of canned products. It is strange that this comprehensive report does not also include the local "Pósitos"³⁸ existing in the SW part of Tenerife and even in La Gomera among the detailed list of "Pósitos" that existed in Spain³⁹. Spanish sea-food products were mostly exported to Italy up to 1933 and later to Argentina and Germany. Was Florio partly responsible for this change? Possibly yes, because this is another strange time coincidence.

The numerous mysteries surrounding this exploitation activity are not only limited to the Florio industry in the Canary Islands, as they also concern various other factories and the local fishery itself. In the absence of sufficient documents, many of these mysteries will remain unsolved.

The rediscovery of the activities carried out by the Florios in the Canary Islands provides us with a further piece of information about the bluefin tuna fishery in the Ibero-Moroccan area and, at the same time, increases our historical knowledge both on the bluefin tuna economy and on the bluefin tuna distribution over the years, still keeping several unresolved questions alive.

6. Acknowledgments

This paper was possible thanks to the supportive cooperation of many persons, colleagues and friends, who helped me in finding rare documents or following very unclear and uncertain tracks over the last century.

Particular notes of thanks are extended to Dr. Rosario Lentini and Prof. Orazio Cancilia, experts on the history of Florio family, who kindly provided the initial information to me and many contacts. Together we discussed many preliminary points of the scarce information available on the Florio's activities in the Canary Islands. Dr. Lentini also helped in revising this paper, for all parts concerning the Florio history.

At the same time, I would like to thank Mrs. Silvana Florio Paladino, the widow of my old friend Cecé (Vincenzo), nephew of Vincenzo Florio, who discussed this part of the family history in depth with me, and for allowing me the use of the photos from the Florio Paladino archive. My sincere thanks are also expressed to the Successors of Enzo Sellerio Editor, for kindly providing the official permit to reproduce and include their old photos in this paper.

A very special thank you is also due to Dr. Guido Enrico Montanari, Coordinator of the Archive Patrimony of the Banca Commerciale Italiana at the Historical Archive of Banca Intesa, who very kindly explored on my behalf the old archives, providing me the copies of many original documents of the Florio company, particularly all those related to its activities in the Canary Islands.

The support of my friend and colleague Dr. Juan Pérez de Rubín Feigl, historical researcher and oceanographer from Instituto Español de Oceanografía (IEO) of Fuengirola, was also essential in the discovery of various pieces of information dispersed in several pages of local Spanish newspapers at the beginning of the XX century. We often discussed together several problematic points of this investigation and he kindly revised several parts of the text.

Essential information was also kindly researched and provided by the Italian Honorary Consul in Santa Cruz de Tenerife, Dr. Silvio Pelizzolo, and the Italian Honorary Consul in Las Palmas de Gran Canaria, Dr. José Carlos de Blasio, both who were able to find important details about the Florio's activities in Tenerife.

³⁷ The sea-food production in the Canary Islands in 1940 was as follows: dried products 4,209.95 t, salted products 3,269.11 t, products in escabeche 24.24 t, canned products 1,519.06 t and other productions 194.96 t.

³⁸ See footnote no. 29.

³⁹ The report includes only three "Pósitos" in Tenerife, all based in Santa Cruz de Tenerife.

A very special thank you is extended to Dr. José María Mesa Martín, multidisciplinary expert, who personally knows the ruins of Florio's factory and who collected very rare and detailed information about the tuna fishing activity in SW Tenerife in old times. His extremely kind and friendly support was essential to better define and understand how the fishery was carried out, where the "Salinas" were located and the manner in which the Florio's factory operated. Discussions with him were going back in history and seeing the Playa de San Juan.

Another very special thank you is to my colleague Philomena Seidita, who very kindly and patiently revised this text.

Finally, I would like to thank all those who helped me in this research in various ways: Dr. Alicia Delgado de Molina Acevedo (IEO-Tenerife), Dr. Erminia Scaglia (Successors of Enzo Sellerio Editore – Palermo), the Archivio Storico of Banca Intesa – Milano, and Mrs. Eva Luz Cabrera García (Ayuntamiento de Arona – Tenerife).

Special appreciation goes to my wife Annie, who assisted me in finding the right contacts in the Historical Archives of Banca Intesa and who very patiently followed the various steps of this complex and difficult research, and who put up with all the disorder I caused at home with piles of open books all over the house as I searched through vague tracks and bits and pieces of information to complete this paper.

Bibliography

Aloncle H., 1964, Note sur le thon rouge de la baie Ibero-Marocaine (II). Résultats d'une campagne de prospection thoniere en baie ibero-marocaine. Bulletin de l'I.P.M.M., 12 : 43-59.

Aloncle H., 1966, Note sur le thon rouge de la baie Ibero-Marocaine (II). Résultats d'une campagne de prospection thoniere en baie ibero-marocaine. Bulletin de l'I.P.M.M., 14 : 29-41.

Alongi R., Gini G., Lentini R. (edit.), 2008, Lo Stabilimento Florio di Favignana. Storia, iconografia, architettura. Soprintendenza BB.CC.AA., Trapani.

Anon., 1831, Diccionario Marítimo Español. Imprenta Real, Madrid: XLVIII+584+187.

Anon., 1926, Nuevos Consules. Concessión del "Regium Exequátur". El Imparcial, LX, no. 20830, 24/10/1926: 3.

Anon., 1927a, Industria Gomeras. La factoria de pescado de Mario Novaro. Revista Hespérides, 11 Octubre 1927.

Anon., 1927b, La pesca del atún en el Sahara occidental español. Bol. Pescas, Madrid, 12 (128): 99.

Anon., 1935-1936, La conservas de pescado y las sanciones a Italia. España Marítima y Pesquera, Nov-Dic-1935, Ene.1936, 11-1935, 121: 17.

Anon., 2007, Proposte per un'ipotesi di gestione dello Stabilimento Florio di Favignana. PON Assistenza Tecnica Obiettivo 1, Misura II.2 Azione 5.4. Ministero del Lavoro e delle Politiche Sociali, Foromez, Roma: 1-34.

Anon., 2011, Deliverable All Tasks.1 – GBYP mid-term Scientific and Technical report for Phase 2- 2011 Activities. July 31, 2011: 1-23 and Annex 1-26.

Anon., 2012a, ICCAT-GBYP Symposium on Trap Fisheries for Bluefin Tuna. Col. Vol. Sci. Pap, ICCAT, LXVII (1): 1-398.

Anon., 2012b, Deliverable All Tasks.2 - GBYP Final Scientific and Technical report for Phase 2- 2011-2012 Activities. June 22, 2012: 1-23 and Annex 1-26.

- Anon., 2012c, La Cantera: un espacio para la recuperación e interpretación del patrimonio histórico-etnográfico de la cultura del mar en La Gomera. IES de San Sebastián de La Gomera, 431, 13/08/2012. <http://www.bienmesabe.org/noticia/2012/Agosto/la-cantera-un-espacio-para-la-recuperacion-e-interpretacion-del-patrimonio-historico-etnografico-de-la-cultura-del-mar-en-la-gomera>
- Anon., 2013a, Florio: tonnara di Tenerife, Isole Canarie. In: Seecily, Guida ad una Sicilia mai vista. Corvo di Salaparuta: 1-116.
- Anon., 2013b, La Cantera, una factoría abocada al olvido. La Voz de la Gomera, Cultura y Tradiciones, 4/11/2013: 4 pag.
- Barone G., 1991, Il tramonto dei Florio. Meridiana, Donzelli Ed., Roma, 11-12: 15-43.
- Bendala Palacios M., 1926, La pesca del atún en La Gomera. La Prensa, 9 de mayo de 1926.
- Bolado F., 2012, Un siglo con la Marina Mercante. Índice de buques indicando su naviera y tomo. 1-76. <http://www.buques.org/Monografias/100AMM/Indice%20Buques.pdf>
- Brito M., 2010, Nombres en el Sur de Tenerife. Llanoazur Ediciones: 1-284.
- Burri R., Freed L., List H., Salgado S., Scianna F., Governali S., 2009, Tempo di Tonni. Favignana: lo Stabilimento Florio. Ass. Reg. Beni Culturali, Regione Sicilia, Palermo: 1-95.
- Cadenas del Mar J., 1934, El Secretario General del Instituto Social de la Marina, Excmo. Sr. Don Alfredo Saralegui, visita las Islas Canarias. España Marítima y Pesquera, IX (104), 30/06/1934: 5-10.
- Cancila O., 2008, I Florio. Storia di una dinastia imprenditoriale siciliana. Bompiani Edit.: 1-735.
- Candela S., 1986, I Florio. Sellerio Edit., Palermo: 1-425.
- D'Angelo M., 1985, Vincenzo Florio, mercante-imprenditore (1799-1868). Atti Conv. studi: Il Mezzogiorno d'Italia, Bari.
- de Buen F., 1922, La pesca marítima en España en 1920. Costa sud-Atlántica y Canarias. Bol. Pesca, 7 (76): 350, 375-390.
- de Buen F., 1923a, La pesca marítima en España en 1920. Costa sud-Atlántica y Canarias. Min. Marina, Madrid, 1: 9.
- de Buen F., 1923b, La pesca marítima en España en 1920. Costa sud-Atlántica y Canarias. Min. Marina, Madrid, 10: 35-50. Comm. Expl. Méditerranée, 3 ns: 115-123.
- de Buen F., 1923c, La pesca marítima en España en 1920. Costa sud-Atlántica y Canarias. Min. Marina, Madrid, 73: 155.
- de Buen F., 1925, Biología del Atún *Orcynus thynnus* (L.) Resultado de las campañas realizadas por acuerdos internacionales. 1, Instituto Español de Oceanografía, Madrid: 1-118.
- de Buen F., 1926a, Catalogo ictológico del Mediterráneo Español y Marruecos. Res. Camp. Acuerd. Intern., 2: 150, 159, 167.
- de Buen F., 1926b, Pêches. Rapp. Proc.-Verb., Comm. Int. Explor. Sc. Medit., Paris: 121-130.
- de Buen F., 1927a, Sobre la biología del atún, su pesca y conservación de sus carnes. Bol. Pesca, 12 (128) : 108-110.
- de Buen F., 1927b, Notes et bibliographie sur la biologie du thon. Proc.-Verb. Cons. Explor. Mer., 44: 98-107.
- de Buen F., 1927c, Notas sobre la biología del atún y de la sardina. Bol. Pesca, 12 (132): 219-229.

- de Buen F., 1928, Pêches. Rapp. Proc.-Verb., Comm. Int. Explor. Sc. Medit., Paris, 3, n.s.: 115-143.
- de Buen F., 1931, El supuesto paso por el Estrecho de Gibraltar del atún en su migración genética. Rapp. Proc.-Verb., Comm. Int. Explor. Sc. Medit., Paris, 6, n.s.: 405-409.
- de Buen F., 1937, Aires de ponte du thon, *Thunnus thynnus* (L.). Arquivos do Museu Bocage, Lisboa (6A) : 1935
- de Buen O., 1920, La pesca marítima en España en 1920. Ideas generales y resumen. Min. Marina, Madrid, I: XXXI-XXXVI.
- de Buen O., 1924a, Las emigraciones del atún en las costas Atlánticas del Sur España. Bol. Pesca, Madrid, 9 (92-93): 93-95.
- de Buen O., 1924b, Les migrations du thon (*Orcynus thynnus*) sur les côtes atlantiques du Sud de l'Espagne. C.R. Acad. Sc., Paris, 178: 1104-1106.
- Delgado de Molina A., 2011, Historia y situación actual de la pesquería de túnidos de las Islas Canarias. Biología y estudio poblacional del patudo (*Thunnus obesus* (Lowe, 1869)) capturado en aguas próximas al Archipiélago canario. Tesis doctoral.
- Delgado de Molina A., Rodríguez-Marin E., Delgado de Molina R., Santana J.C., 2014, Atlantic bluefin tuna (*Thunnus thynnus*) (Linnaeus, 1758) fishery in the Canary Islands. Coll. Vol. Sci. Pap. ICCAT, 70(2): 499-510pp.
- Díaz Lorenzo J.C., 2010a, Las motonaves de D. Álvaro Rodríguez López. Vida marítima, 10/12/2010. <http://vidamaritima.com/2010/12/las-motonaves-de-d-alvaro-rodriguez-lopez/>
- Díaz Lorenzo J.C., 2010b, Álvaro Rodríguez López, el Naviero más importante de Canarias en el siglo XX. De la Mar y los Barcos, 15/12/2010. <http://delamarylosbarcos.wordpress.com/2010/12/15/alvaro-rodriguez-lopez-el-naviero-mas-importante-de-canarias-en-el-siglo-xx/>
- Di Natale A., 2012, Literature on the eastern Atlantic and Mediterranean tuna trap fishery. ICCAT-GBYP Symposium on Trap Fishery for Bluefin Tuna, Tangier. Collect. Vol. Sci. Pap. ICCAT, LXVII (1): 175-220.
- Di Natale A., 2014, The ancient distribution of bluefin tuna fishery: how coins can improve our knowledge. Collect. Vol. Sci. Pap. ICCAT, 70(6): 2828-2844.
- Di Natale A., Idrissi M., Justel-Rubío A., 2013, The mystery of bluefin tuna (*Thunnus thynnus*) presence and behavior in central-South Atlantic in recent years. ICCAT Col. Vol. Sci. Pap., 69 (2): 857-868.
- Di Natale A., Idrissi M., Justel-Rubío A., 2014a, ICCAT Atlantic-wide Research Programme for Bluefin Tuna (GBYP), Activity report for 2013 (extension of Phase 3 and first part of Phase 4). Collect. Vol. Sci. Pap. ICCAT, 70(2): 459-498.
- Di Natale A., Idrissi M., Justel-Rubío A., 2014b, ICCAT-GBYP activities for improving knowledge on bluefin tuna biological and behavioural aspects (ICCAT-GBYP Phases 1-3). Collect. Vol. Sci. Pap. ICCAT, 70(1): 249-270.
- Escudero Domínguez L.J., 2005, Los italianos y la industria de salazón. Primeras aportaciones y su aparición en el Cantábrico. VII Congreso Asociación de Historia Económica, Santiago de Compostela: 3-5.
- Escudero Domínguez L.J., 2007, Historia de los salazoneros italianos en Cantabria. Servicio de Publicaciones de la Universidad de Cantabria, Santander: 1-279.
- Escudero Domínguez L.J., 2012, La industria transformadora de la pesca en Lekeitio. La era de los cambios (1800-1936). BIBLID, 1136-6834, Vasconia, 38: 261-296.

- Fierotti Agrigento P., 1983, I Florio. Terrasanta Ed., Palermo.
- Furnestin J., Dardignac J., 1962, Le thon rouge du Maroc Atlantique (*Thunnus thynnus* L.). Revue des Travaux de l'Institut des Pêches Maritimes, Paris 26(4) : 381-398.
- Galván A., Pascual J., 1989, La pesca en el Sur de Tenerife: Calmas, factorías, túnidos y turismo. Etnografía Española, 7, pp. 59-113.
- Giuffrida R., 1975b, Un capitano d'industria dell'Ottocento: Vincenzo Florio (1799-1868). Economia e Credito, Palermo, 3.
- Giuffrida R., Lentini R., 1985, L'età dei Florio. Coll. I Cristalli. Enzo Sellerio ed., Palermo: 1-287.
- Guimerá Peraza M., 1999, Juan Cumella y la política de su tiempo (1818-1898). Anuario de Estudios Atlánticos, Ed. Cabildo Insular de Gran Canaria, Las Palmas, 45: 343-461.
- Gutiérrez Bicarregui J.L., 2002, Santoña nuestra villa. Ayuntamiento de Santoña: 1-259.
- Hernández Armas R., 2010, Patrimonio espacio turístico en el sur de Tenerife ¿un matrimonio imposible? II Jornadas de Historia del Sur de Tenerife, Arona, Julio 2009: 261-284.
- Lamboeuf M., 1975, Contribution à la connaissance des migrations des jeunes thons rouge a partir du Maroc. Coll. Vol. Sci. Pap., ICCAT, 4 : 141-144.
- Lentini R., 1984, Aromatari, negozianti-banchieri e padroni di mare calabresi a Palermo: i Barbaro ed i Florio. Atti Accad. Scienze, Lettere ed Arti, Palermo, AA 1983-1984, V (IV), 2: 201-214.
- Lentini R., 2008, Favignana nell'800: architetture di un'economia. In: Lo Stabilimento Florio di Favignana. Storia, iconografia, architettura. Soprintendenza BB.CC.AA., Trapani: 15-257.
- Lentini R., 2013, La rivoluzione di latta. Breve storia della pesca e dell'industria del tonno nella Favignana dei Florio. Torri del Vento Edizioni, Palermo: 1-112.
- Li Vigni B., 2013, La dinastia dei Florio. Sovera Multimedia, Roma: 1-320.
- Lledó Martín J., 1943, La pesca nacional. Ediciones Pegasus, Madrid: 1-489.
- Marasà G., 2010, Ignazio Florio. Avventure Galanti di un playboy della Belle Époque. Torri del Vento Edizioni, Palermo: 1-77.
- Mather F. J.III, Mason J. M., Jones A. C., 1995, Historical Document: Life History and Fisheries of Atlantic Bluefin Tuna. NOAA Technical Memorandum, NMFS-SEFSC, 370: 1-375.
- Mesa Martín J.M., 2003, La pesca del atún en el suroeste de Tenerife: Guía de Isora y la vecina isla de La Gomera. El Pajar, La cultura de la mar: más allá del mar. Cuaderno de Etnografía Canaria, 16: 60-73.
- Pascual Fernández J., 1991, Entre el mar y la tierra. Los pescadores artesanales canarios. Ministerio de Cultura, Editorial Interinsular Canaria: 1-293.
- Perdigon Díaz U., 2012, La Hoya La Fábrica. In: Playa de San Juan – Playa de Agua Duce. http://www.senderistas.info/Playa_San_Juan_Agua_Dulce.htm
- Pérez Barrios C.R., 2003, Entre el apogeo y la crisis. Aspectos económicos de Guía de Isora en los siglos XIX y XX. Biblioteca de Estudios Isoranos: Serie de estudios históricos. Ayuntamiento Guía de Isora: 1-217.
- Piccinetti C., Di Natale A., Arena P., 2013, Eastern bluefin tuna (*Thunnus thynnus*, L.) reproduction and reproductive areas and seasons. ICCAT Col. Vol. Sci. Pap. 69(2) 891-912pp.
- Pitrone G., 2014, Donna Silvana Paladino, la Signora dell'Arenella. Archivio Venere: Scienze, Letteratura e Passioni. http://www.palermomania.it/news_rub.php?id=1808

- Quatriglio V., 1991, Diventa museo la Tonnara Florio: a Favignana un esempio di archeologia industriale. Kalos, Arte in Sicilia, Riv. Bim., 3 (3-4): 1-56.
- Quílez-Badía G., Cermeño P., Tudela S., Sainz Trápaga S., Graupera E., 2013b, Spatial movements of bluefin tuna revealed by electronic tagging in the Mediterranean Sea and in Atlantic waters of Morocco in 2011. ICCAT, Col. Vol. Sci. Pap., 69 (1): 435-453.
- Quílez-Badía G., Cermeño P., Sainz Trápaga S., Tudela S., Di Natale A., Idrissi M. Abid N., 2013b, 2012 ICCAT-GBYP pop-up tagging activity, in Larache (Morocco). ICCAT Col. Vol. Sci. Pap., 69 (2): 869-877.
- Ravazza N., 2007, I Florio, l'economista ed il «monta-leva». www.cosedimare.com/tonnare/monta_leva.php
- Requirez S., 2011, Storia dei Florio, Flaccovio Edit., Palermo: 1-184.
- Rial J., 1935, Plata en escamas. La riqueza pesquera de las Islas Canarias. España Marítima y Pesquera, X (119), 30/09/1935: 10.
- Ríos Jiménez S., 2006, Evolución de la gran empresa almadrabeto-conservero andaluz entre 1919 y 1936: génesis y primeros pasos del Consorcio Nacional Almadrabeto. Historia Agraria, Revista de Agricultura y Historia rural, 41: 57-82.
- Rodríguez Henriques K.N., 2012, La pesca artesanal en el contexto de Gestión Integrada de Zonas Costeras: el caso de estudio de las Cofradías de Pescadores de Garachico y Playa de San Juan, Tenerife, Canarias. Series Tesis Doctorales, Universidad de la Laguna, Curso 2012/13, Humanidades y Ciencias Sociales: 1-428.
- Rodríguez-Roda J., 1964, Biología del atún, *Thunnus thynnus* (L.), de la costa sudatlántica de España. Investigaciones Pesqueras, Barcelona, 25: 33-146.
- Rodríguez-Roda J., 1975, Expedición científica para la identificación de zonas de puestas del atún, *Thunnus thynnus* (L.) (Campaña "Maroc-Iberia, I" del "Cornide de Saavedra"). Res. Exp. Cien., B/O Cornide, Barcelona, 4: 113-130.
- San José T., 2007, La memoria italiana de la anchoa, en conserva. El Diario Montañés, 03/05/2007: http://www.eldiariomontanes.es/prensa/20070305/cantabria/memoria-italiana-anchoa-conserva_20070305.html
- Santos Guerra J., 1976, La pesca del atún rojo (*Thunnus thynnus* L.) en Canarias: resultados preliminares (enero-octubre 1975). Col. Vol. Sci. Pap. ICCAT, 5(2): 242-243.
- Santos Guerra J., 1977, Resultados preliminares de la pesquerías Canarias de Tunidos en 1976. Col. Vol. Sci. Pap. ICCAT, 6(2): 439-440.
- Sarà R., 1983, Tonni e Tonnare. Una Civiltà, una Cultura. Libera Università di Trapani Ed., Trapani : 1-128.
- Sarà R., 1998, Dal mito all'aliscafo. Storie di Tonni e Tonnare. Banca Aegusea Ed., Favignana-Palermo: 1-271.
- Tashiro J.E., 1980, A report of data collected and publications resulting from the research cruises of the Geronimo and Undaunted in the tropical Atlantic Ocean, 1963-1969. NOAA Technical Memorandum NMFS-SEFC 60: 1-166.
- Torrente M., 2005, La rinascita della Tonnara Florio. www.cosedimare.com/tonnare/tonnaraflorio.php

Table 1. Società Anonima Tonnare Florio, audit report in 1934: Production of Atlantic-origin bluefin tuna canned in oil. The last two rows of the table include the estimation of the same production raised to the fresh catch quantity, according to the conversion factor in the tuna traps of Barbate and Favignana.

<i>Production</i>	<i>1930 (tons)</i>	<i>1931 (tons)</i>	<i>1932 (tons)</i>	<i>at 15 Dec 1933 (tons)</i>	<i>estim. 1933 (tons)</i>
Bluefin tuna imported from the Atlantic and canned in olive oil		108.8	39.2	236.8	280.0
Bluefin certainly produced by Florio in the Atlantic	51,5	106,8	39.2	nd	nd
Extrapolation of the Florio Atlantic bft canned in oil production to total catch (using the conversion factor from Barbate trap at that time, when bft canned in oil represented about 42.6189% of the total catch)	120.84	280.56	102.98		
Extrapolation of the Florio Atlantic bft canned in oil production to total catch (using the conversion factor from Favignana trap at that time, when bft canned in oil represented about 51.8165% of the total catch)	99.39	206.11	75.65		



Figure 1. Side view of the Florio fish factory in SW Tenerife (Canary Islands, Spain), along the shore of Playa de San Juan (Guía de Isora). Photo from the Archive of Florio Paladino, reproduced with the kind permission of Mrs. Silvana Florio Paladino and the Successors of Enzo Sellerio Editore ©.



Figure 2. An internal part of the Florio's factory in Tenerife, showing some plants for salting fish in barrels, for export purposes. These wooden barrels were mostly used for small pelagic species. Photo from the Archive of Florio Paladino, reproduced with the kind permission of Mrs. Silvana Florio Paladino and the Successors of Enzo Sellerio Editore ©.



Figure 3. Mr. Ignazio Florio Jr. in his home in Tenerife (possibly in 1926). Photo from the Archive of Florio Paladino, reproduced with the kind permission of Mrs. Silvana Florio Paladino and the Successors of Enzo Sellerio Editore ©.

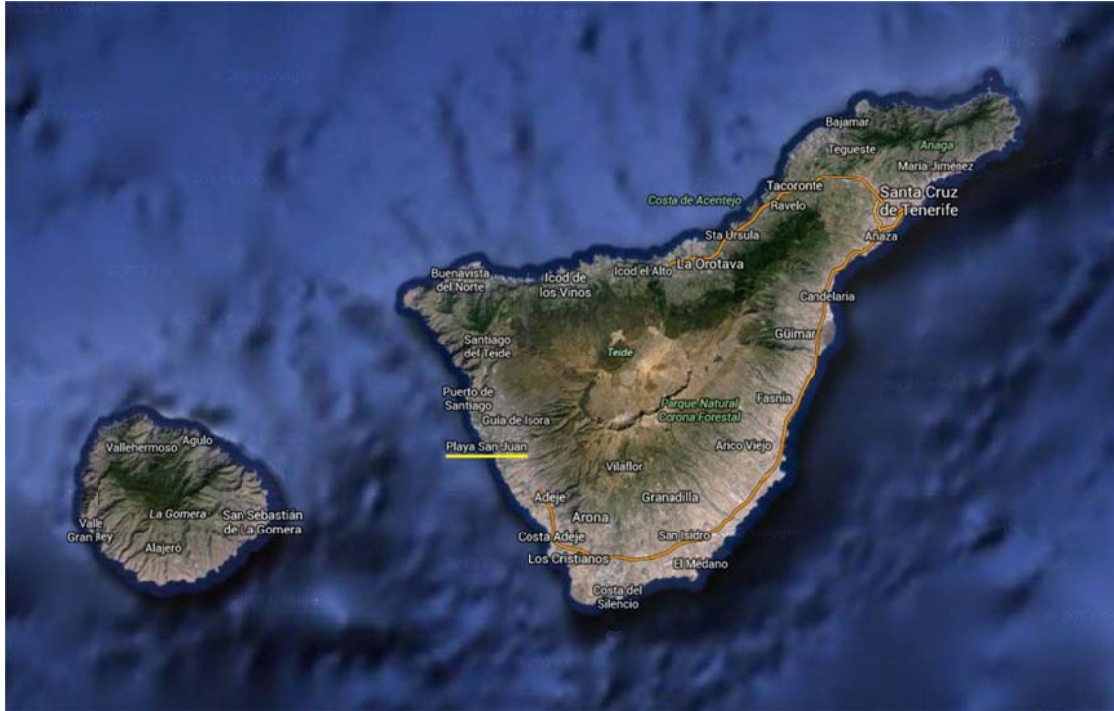


Figure 4. The islands of La Gomera and Tenerife, indicating the Playa de San Juan where the Florio’s fishing activities were base in the ‘20s (from Google Maps©).



Figure 5. One of the old tuna fishermen working between Playa de San Juan and La Gomera: Mr. Antonio González García, nicknamed “Cho Antonio el Calanero”, born in Alcalá, Guía de Isora, but then fishermen and wooden-boats master builder in La Gomera. He worked with a handline of 200 m and was able to catch bluefin tunas up to 400 kg. Photo from Marcos Brito http://marcosbritom.blogspot.com/es/2013_08_26_archive.html.



Figure 6. The steamer vessel SANCHO II in Tenerife. This vessel was used by Florio to transport canned tuna produced in Playa de San Juan. Photo Archivio FEDAC.