CHIOGGIA’S FLEET FISHERY MIGRATION IN THE ADRIATIC SEA BETWEEN THE 19TH AND THE 20TH CENTURIES*.

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Abstract
Chioggia’s fishing fleet represented historically (mainly in XIX century) one of the most important fleet in the whole Adriatic Sea. For many centuries fishermen belonging to this town were used to exploit several fishing grounds all over this area, migrating along its coastline according to fishing season and climate conditions. In this paper we describe the fishing activity of Chioggia’s fleet between the 19th and the early 20th centuries. Fishing fleet features such as type and number of fishing vessels, fishing gears and spatio-temporal distribution of the fishing activities will be presented along with a description of the main target species caught in different areas. The social-economic implications of such activity, such like conflicts with other fleets, will also be discussed.

Introduction
Chioggia is located in the southern part of the Venetian Lagoon, along the western shallow sandy coastline of the northernmost part of the Adriatic Sea. This city is connected to the sea by an inlet or “bocca di porto” of the port of Chioggia. Chioggia’s position has encouraged, in the past, salt and fishing activities. Fishing activity, in particular, has been characterising up to the present Chioggia’s history. Even if the fishermen of Chioggia used to exploit both marine and lagoon resources, this study focuses essentially on high sea fisheries. The aim of this study is to analyse Chioggia’s fleet fishery and migration in the Adriatic Sea, in the period between Chioggia came under the Italian Realm (1866) and the interruption of fishing activities due to the forthcoming First World War (1915).

During the early Medieval period Chioggia’s inhabitants were mainly employed in the salt industry and trade, and in the commercial activity of other goods, carried out by sailing boats. Traditionally another part of Chioggia’s inhabitants used to fish in the Venice Lagoon and in the sea water around Chioggia. In the middle of the XVIth Century the salt industry lost its importance due to a change in the Serenissima Republic policy which displaced salt production to other areas
(Perini, 1989). Consequently a lot of workers employed in such activity lost their jobs and most of them moved to fishing activities in the Venice Lagoon, since its fauna was at that time plentiful and variegated and, consequently, substantially underexploited (Perini, 1989). At the end of the XVIth Century the increase in fishing effort and capacity trigged a worrying decrease of lagoon fishing profits and this lead to the displacement of part of the fishing activities of Chioggia’s fleet to the Adriatic Sea. This process is considered by Perini (1992) the beginning of Chioggia’s vocation to marine fishery. In the course of time Chioggia became the most important fishing port of Northern Adriatic Sea, an importance that has been preserved until now, and was mainly built by the brave and daredevil fishermen that migrated for long periods to far distances along all the Adriatic Sea and even further, to challenging a lot of risks to assure earnings for their miserable proletarian class. The Chioggioti’s, as the fishermen from Chioggia were named by foreigners, attitude to migration for fishing is consequently traced back in time, at least at the end of the XVIth Century.

Traces of the migration of Chioggia’s fishery fleet can be found in some more recent historical records, such as those which report the conflicts between Chioggiotti and the Eastern Adriatic Sea fishermen. For instance, at the beginning of the XVIIIth Century (1716), the Podestà of Capo d’Istria (a town located in the northernmost East Coast of the Adriatic Sea) banned Chioggiotti’s fishery on Istrian waters (Marella, 1890). In practice no rules to limit the Chioggiotti’s activity were enforced until 1770, then the “Giustizia Vecchia” (the Serenissima’s office in charge of managing fishing activities), pressed by Rovigno’s fishermen, abolished fisheries authorisation in the Eastern Adriatic Sea.

(Figure 1: Most important cities, gulfs and islands interested by Chioggiotti’s fishing activities between 19th and 20th Centuries).

Structure of Chioggia’s fishery fleet

The abolishment of fisheries authorisation in the eastern Adriatic caused changes in the structure of Chioggia’s fleet: the Tartana (large sailing boats, which were adopted for fishing activities in foreign waters) were replaced by the Bragozzo (Figure 2: A typical Chioggiotti’s boat, the Bragozzo. Faber, 1883), which was characterised by smaller tonnage, reduced number of fishermen needed for fishing operations (3-5 men against 8; Marella, 1890), and by lower expenses for its construction and maintenance (2300 L, Italian Lire, against 7000 L, Marella, 1890). Due to these features, the Bragozzo became a more profitable boat. Changes in the composition of Chioggia’s marine fleet were so sharp that in 1780 the Giustizia Vecchia’s Bench, worried by the decline in the number of Tartana fishing boats, which was considered to impair Chioggiotti’s capability of fishing in foreign waters, drove the Venetian Senate to abolish its former decree law.
But the structural change had already started and it was not possible for the Venetian authorities to stop this process. As reported by Marella (1890), only two Tartana where left in Chioggia’s fishery fleet in 1890 whereas about 1080 Bragozzo fishing vessels were adopted (Memmo, 1985).

In 1866, the starting date considered in this paper, Chioggia’s fishing fleet was for sure the most important all over the Adriatic Sea and fishing activities represented the most important source of profit for Chioggia’s inhabitants. In fact, considering Chioggia’s fishery data referred to this year it is possible to highlight that a noteworthy part of the populations, about the 21% (Memmo, 1985) was constituted by fishermen (a total number of 4500 people) and another part was involved in activities to support commercial fishing, as like boat and fishing gears construction. The Chioggiotti were used to carry out several different fishing activities, either in the Venetian Lagoon, in the “Valle” (those areas inside the lagoon which were substantially devoted to marine culture-based aquaculture) and in the Adriatic Sea, by using different specific fishing gears and boats. According to Memmo (1985), in the 1869 the Chioggia’s fishing fleet was constituted by about 2500 boats (see below for better technical details): 50 Tartane, 550 Bragozzi, 700 Velieri (mainly used for fishing in marine waters) plus 1200 lagoon and “Valle” boats. Regarding the Bragozzi 510 of these were high sea boats and about 313 of them were known to fish in Austro-Hungarian Empire’s waters.

It is possible to evaluate the greatness of this fleet by considering that in the same period (1869) in all the Eastern Adriatic coastline, under the Austro-Hungarian Empire, there was a total of 1269 fishing boats, half respect to Chioggia’s fleet, and 4049 fishermen are reported by Faber, (1883). The importance of Chioggia’s fishing fleet activity along the Eastern Coast of the Adriatic is witnessed by the special attention paid by Faber to this fleet in the book he wrote (1883) regarding the “Fisheries of the Adriatic. The Austro-hungarian sea-fisheries”. In the same book the author stated that only a slight number of fishing vessels (about 10-20) belonged to other Italian fishing fleets (mostly Rimini). This book includes a very detailed description of fishing activities along the Eastern Adriatic coast, as like the quantification of the catches, fishing boats and fishing gears and represents the first important reference for describing Chioggiotti’s activity in that area. Nevertheless it must be pointed out that, although the quantification of fishermen number and sailings boat is very clear, the spatio-temporal description of fishing activities is less precise or missing, such as any information regarding the migration of Chioggiotti southwards along the Western Adriatic Sea coast.

According to the role played by the Chioggiotti in the Eastern Adriatic coastline, conflicts between them and local fishermen were frequent during the Austrian’s domination of this area (Neptunia 1902). Chioggiotti’s fishery prohibition in foreign waters (1835, 1841) were alternated to fishery’s
authorisation (1858). At the half of XIXth Century, when Chioggia passed (1866) to the Italian government, the Italian fishing activities in the Austro-Hungarian Empire were regulated by Trade and Navigation Agreements, that were renewed almost each ten years: 1869, 1878, 1891, 1904. These Agreements allowed reciprocal fishery’s permission in foreign waters and banned all the harmful methods, as like dynamite and other explosive matters or nets that were considered to compromise fish eggs and juveniles (Levi Morenos 1903).

Between 1866 and 1884, the number of Chioggia’s fishermen and boats was subjected to a reduction caused by the obstacles imposed by Austro-Hungarian Empire that would have to close its waters to the foreigners, and just 2644 fishermen remained active in 1876 (Memmo, 1985). All the above mentioned also determined a decrease in the number of “calafati” (the craftsman making fishing boats) that in the 1871 migrated to Trieste (which, at that time, was under the Austrian rule) searching for job (Memmo, 1985). As a consequence the number of fishing boats built in Chioggia per year decreased from 71 in 1870 to 48 in 1873 (Memmo, 1985). This situation changed in 1884 when the Gorizia Conference imposed a strict respect of the Trade and Navigation Agreement already existent between Italian Realm and Austro-Hungarian Empire, establishing that fishermen of both countries could fish in foreign waters respecting the limit of one mile from the coastline (area which was left for the exploitation by the local fishermen) and in areas deeper than eight meters, reserving the coral and sponge fisheries to local operators (Morenos, 1903). In this relative quiet, the Chioggia’s fishery restarted to develop and a ever increasing number of Chioggiotti started to migrate in foreign waters. Domenico Razza wrote (free translation from Neptunia, 1895): “In past time, until ten years ago, Chioggiotti’s fishery along Istrian coastline wasn’t remarkable. At the first days of August until November, some Tartane used to fish there (…). On the contrary now that sea is fished periodically”.

Type of Fishing vessels and their gears

Before starting the detailed analysis of Chioggia’s fleet fishery migration we think the reader would benefit from the description of those fishing vessels and fishing gears that were adopted by Chioggiotti in marine fishery. According to Bellemo (1908-12) and Levi Morenos (1916), a huge variety of fishing vessels were used by Chioggia’s fishermen during their activities in foreign waters, namely the Battello da pizzo, Bragozzi, Bragozzetto, Sardelliera and Tartana. The Battelli da pizzo were little boats of about 7 meters of length, with a crew of three fishermen; due to their small tonnage of about 3-5 tonnes they were adopted only along the Veneto’s coastline and mainly used in the Venice Lagoon fisheries. This fishing boat advanced through the water by
rowing and sailing (“vela al terzo”, Marella, 1890. Figure 3 Typical sails shape of Chioggia fishing fleet. Memmo, 1985).

The Bragozzo in particular was the typical Chioggia’s fishing vessel most often used to migrate along the Adriatic Sea coastline. It was built only in this town and its use was a prerogative of the Chioggioti. It measured about 8-14 meters of length, with a tonnage of 6-10 tonnes, and had 3-5 men on crew. The Bragozzo was characterised by two masts and sails “al quarto” (Figure 3) with lively colours and images that represented family’s ownership symbols (Figure 4: A Bragozzo sail showing the symbol of the family Pulinari. La Pesca in Mare, 1985). Equal in shape, but smaller, with just one mast and one sail, was the Bragozzetto (Marella, 1890).

Last typical boat was the Sardelliera that were similar to Bragozzo, but smaller (about 5 tons at the end of XIXth Century. Memmo, 1985) and practised fishery activities to catch sardines or soles.

Finally the above mentioned Tartana, that in the considered period was utilised in very small number by Chioggia’s fishermen and whose main futures were the large size (about 18-30 meters of length and 10-15 tonnes) and the high number of fishermen needed for fishing operations (about 8 people).

Every type of boat, described above, had its own specific fishing gears. Levi Morenos (1916) reported 7 different kind of fishing gear, either active (towed) and static gear, frequently used by the Chioggioti in their fishing activities along the Adriatic Sea coastline. This is a very small variety when compared to the about 60 different fishing gear that they were used to adopt in the Venice Lagoon and for the inshore fishery in the marine areas close to Chioggia. This difference can be ascribed to the very high specialisation of fishing activities and variety of target species, in the second case, where almost each commercial species was exploited by means of appropriated, selective fishing gears (see Levi Morenos, 1916, for further details).

Regarding the towed fishing gear they were the Ostreghero, the Tartanella and the Cocchia, all these were conceived in order to catch demersal and benthic species (those species which lays on or immediately above the sea bottom) and consequently interacted, at different extent, with benthic biota.

All these kind of nets were sometime used by Battelli, but more often by larger boats Sardelliere or Bragozzi, along all Italian coastline and often along Eastern coastline (in this case mainly Bragozzo).

The Ostreghero was a sort of “beam trawl” and was composed by a net with large meshes fixed to a wood or iron semicircle (named massa) which allowed to maintain the shape of the opening of the net; a little wood stick named bastonzin was even fixed to the net mouth. Sometimes iron teeth were rigged to the lower part of the net mouth in order to improve the efficiency of the fishing gear. The
Chioggiotti were used to fish by using at the same time two or three Ostreghero (Figure 5: Bragozzo fishing with Ostreghero gears. Marella, 1890) according to the size of the boat. These fishing gears were fixed by different ropes one astern, one on the bow and the last one at the middle of the boat (Marella, 1890). The most important target species caught by the Ostreghero were the common sole (Solea solea), turbot (Psetta maxima) and plaice (Platichthys flesus).

The Cocchia was a net towed by a couple of Bragozzi (like the old Tartana, Figure 6: Two Bragozzi fishing with a Cocchia. Faber, 1883) which carefully controlled their speed and distance during fishing operations to maintain the correct horizontal opening of the net, which had a cone shape with meshes of smaller size at its end. It was constituted by three parts named cielo (the first one), porta (the middle one) and the cogolo (the last one). The vertical opening of the net was obtained by the presence of a headline, set with some floats (usually made by cork) and a ground rope, which was set with stones, lead or iron chains (Faber, 1883).

The Tartanella, instead, was a small Tartana (Marella, 1890); it was a cone shaped trawl net which usually was less efficient than the Cocchia, being smaller, but it had the interesting future of needing only one fishing vessel to be towed (generally a Battello da pizzo or a Bragozzetto). The gears was fixed on the bow and astern by two large wood poles named spunteri (Figure 7: A Bragozzetto fishing with a Tartanella gears. Marella, 1890) and was shot to the overboard on wind’s direction. The Tartanella was a typical multi-specific fishing gear, being able to catch several different commercial species, as like common pandora (Pagellus erythrinus), red mullet (Mullus barbatus), european hake (Merluccius merluccius), black scorpionfish (Scorpaena porcus) and whiting (Merlangius merlangus).

Static gear were mainly mono-specific, being conceived to catch only one (or few) species, in particular sardines (Sardina pilchardus), common soles (Solea solea), herrings (Sprattus sprattus) and mackerels (Scomber scomber) which were respectively fished by means of the Rè da sardele, the Rè da sfogi o sfogioni, the Rè da renghe (where Rè stands for “net” in Venetian dialect) and the panole. Sharks, rays and other species were caught by means of longlines named Amanti.

The Rè da sardele, also named Melaidi was a gill net (basically a net constituted by a series of panels of the same mesh size) kept vertically open by a lead (or stone) foot-rope and a headline with floats. According to the fishermen strategy the proportion of lead and floats was changed in order to set the net to float (a brocco) or to extend vertically from the sea bottom (a fondo).

The Rè da sfogi o sfogioni had the same shape but was used only in contact with the sea bottom; during fishing it was anchored from one side to a large stone and directly to the boat at the other side. The Rè da sfogioni had only larger meshes in comparison to the Rè da sfogi being sfogioni large common soles (sfogi). The Rè da renghe, instead, was a drifting net left into the water. Panole
was a fishing line, 30-40 meters of length, with lead foot-rope, which was baited with crabs (crabs were smashed alive and their remains distributed over the net before shooting).

The *Amanti* were longline 480 meters long, equipped with hooks each two meters and baited with sardines, cuttlefish or other species. The fishermen, according to the target species, set the net to float (floating longline) or to lay nearby the seabed bottom (in this case adding some stones to the longline) (Marella, 1890).

During migrations, *Chioggiotti* organised themselves in big companies, constituted by 18 or 20 *Bragozzi*, with an expert fisherman at the head of the group. *Bragozzi* were mainly adopted to fish in couple towing the *Cocchia*, but sometimes they were used to fish with the *Ostreghero*. To save time, other fishing vessels named *Portolata*, smaller and faster than those dedicated to the fishery, were adopted only to transport the catches to the fishing markets (Marella, 1890). On the one hand this solution, as stated by Levi Morenos (1916), allowed to reduce the time needed to reach the fishing markets preventing the risk of fish degradation due to high temperature and to the low quality of storage equipment; on the other hand it let fishing activities to continue without “wasting time” for transporting the fish. At the end of the fishing season the increased catches largely compensated the expenses for the *Portolata*.

The earning of each fishing vessel was divided in several parts whose composition was based on an old fishermen tradition: the 25% of the total was devoted for every kind of expenses (food, drink, fish’s boxes, etc.); the remaining 75% was shared in 40% for the fishing vessel’s owner whereas the remaining 60% was divided between the crew (Neptunia, 1893-4). Interestingly, since fishermen were illiterates, they took notes of earning and expenses using Phoenician or Etruscan signs (Neptunia 1893-4).

Spatio-temporal distribution of fishing activities

In order to reconstruct Chioggia’s fishing fleet migration between the 1866 and 1915 with the most possible detail, a part from the already mentioned sources (Faber, 1883 and Marella, 1890) we focussed at first on the description given by Levi Morenos, who dedicated in 1916 a paper to this topic in the scientific journal *Regio Comitato Talassografico*. At that time Levi Morenos was the director of the Veneto Fishing and Aquaculture Society that he had founded in 1893, which had the aim of improving the life quality of Italian fishermen, by increasing their technical and scientific background, and promoting any initiatives to improve their economic situation. Accordingly, in April 1903, Levi Morenos founded the Venetian School of Fishery which had the aims of organising lessons for fishermen, congresses and conferences. In order to support national rights on
international waters, Levi Morenos’ Society took part to the renewal of Commerce Agreement with Austro-Hungarian Empire, mainly contrasting new duties (Levi Morenos, 1903) on imported product, that would have damaged Chioggiotti interests.

Levi Morenos’ analysis of Chioggiotti’s fishery migration was based on several data regarding the years 1913-1914 and collected by Don Eugenio Bellemo, a priest which was the director of the Chioggia’s section of Veneto Fishing and Aquaculture Society.

In his paper the author summarised the data by distinguishing Chioggiotti fishery in three different groups. The first one was constituted by 1053 boats (Bragozzi and Battelli da pizzo) that fished for all the year in lagoon (973) and coastline (80), between the Piave river mouth and Po di Goro; these fishermen utilised a large variety of fishing gears, including fike nets, traps, static gears and small trawled nets. The second group was used to exploit during all the year the area between Austro-Hungarian boundary (Porto Buso) to Ancona (Central Western Adriatic), and was constituted by 1500 fishermen on 324 Bragozzi utilising the Cocchia, the Tartana and the Amanti. The third one was constituted by 1250 fishermen boarding on 250 Bragozzi and Sardelliere utilising the Amanti and the Cocchia, that exploited Ancona coastline during April and July and migrated to Austro-Hungarian waters between August to April.

This picture is very valuable, since it represents the first available comprehensive description of Chioggiotti’s fishery migration along the Adriatic coast; moreover the paper of Levi Morenos includes further interesting insights regarding this activity which will be discussed below. Unfortunately, the paper referred to data which were are not available for a comparison, hence we focussed on data published by Bellemo on the scientific journal Neptunia (the Veneto’s school periodical publication which lasted from 1891 to 1912) regarding the years 1908-1912. These data described the period immediately before the years considered by Levi Morenos. The aim of this analysis was to verify if further, more detailed, information were available and to test if Levi Morenos synthesis could be extended for previous periods.

Bellemo’s reports included specific data referred to three different seasons (spring, fall, and winter,) , and to the years 1908-1909, 1910-1911 and 1911-1912. Data had a better detail than those reported by Levi Morenos, since they described the fishing fleets in terms of fishing vessels and fishing gears composition, but referring to smaller geographical units. Furthermore, the list of the major fishing markets, the qualitative composition of the commercial catch, and even the quantification of the fishermen’s earnings were provided.
The fishing grounds considered by Bellemo, from the south of the western coast of the Adriatic Sea to the south of the eastern Adriatic coast were: Marche, Romagna-Veneto and Veneto coastline, Trieste Gulf, Quarnero Gulf, Segna, Dalmazia, Zara, Spalato, Makarska.

Since a first analysis of data highlighted that the spatio-temporal pattern of fishing activities was almost the same for the different years considered, we summarised them as their average value per fishing season and fishing ground.

During Spring 527 boats (354 Bragozzi, 45 Bragozzetti, 93 Sardelliere and 35 Battelli da pizzo) and about 2070 fishermen fished along Italian coastline, from Porto Buso to Ancona, and just 145 boats (138 Bragozzi and 7 Portolate) and about 620 fishermen along Eastern Adriatic, from Porto Buso to Makarska. In particular 93 Sardelliere fished along Romagna-Veneto to catch sardines using the Melaidi. As reported by Bellemo and Levi Morenos fishermen were used to leave Romagna and Marche coast at the end of Summer because in that period these fishing grounds became poorer in terms of catches for every kind of fish.

In fact during Fall boats and fishermen operating in these areas decreased to 423 fishing vessels (270 Bragozzi, 76 Bragozzetti, 23 Sardelliere, 40 Battelli da pizzo and 24 Portolate) and 1570 operators. Fishing capacity decreased further in Winter to 354 fishing vessels (197 Bragozzi, 47 Bragozzetti, 50 Sardelliere, 60 Battelli da pizzo) and 1376 fishermen.

On the contrary many boats migrated during the cold period to the Eastern Adriatic coastline and on the basis of Bellemo’s reports it is possible to reconstruct where some of them were used to migrate. In fact, the number of boats recorded in Spring, 59% of the total located in the Trieste Gulf, increased notably during Fall to 211 boats (153 Bragozzi, 5 Bragozzetti, 47 Sardelliere, 6 Portolate) and 969 fishermen, in particular in Istria (24%) and Quarnero (21%). During Winter further fishing vessels reached the Eastern Adriatic coastline, namely 256 boats (185 Bragozzi, 8 Bragozzetti, 48 Sardelliere, 16 Portolate) and 1212 fishermen, especially to Dalmazia (29%) and Istria (24%). In particular, Sardelliere appeared in the cold period because sardines where known to migrate in this period from shallow water (along Italian coastline) to deeper fishing grounds to find more stable and warm temperatures, especially along Dalmazia coastline. Similarly Sardelliere went back to Italian coast during late Winter (at the end of February) when sardines approached this area at the begin of the warming of waters.

In Winter the Chioggiotti used to migrate to the Istrian coastline also to catch large common soles (sfogioni) which concentrated in this area for spawning. In addition they exploited the Eastern Adriatic to catch some valuable species as like Norway lobster (Nephros norvegicus) and lobster (Homarus gammarus), especially in the Quarnero Gulf. It is worth noting that local fishermen were
not able to catch these species in large amount since their fishing gears were not set in appropriate way.

The data reported by Bellemo regarding the earnings of different fisheries and fishing grounds provides interesting insights to understand the use of *Chioggiotti* to migrate, showing on average that largest profits came from the Eastern Adriatic coastline. In Spring, differences between the two coasts were small: for instance each fisherman’s earning was respectively 18.8 L, 17.5 L, 18.1 L in Marche, Romagna and for sardines fishery in comparison to 20.4 L, 19.7 L, 18.4 L in the Trieste Gulf, Istria and Quarnero fisheries.

During Fall the profits along the Italian Coast were almost constant (e.g. 18.3 L for inshore fisheries) but lower when compared to those of the Eastern coast, especially Istria (25.1 L), Quarnero (23.8 L) and Trieste Gulf (23.5 L). In Winter the picture was almost the same, for instance in the Romagna-Veneto the week earning of each fisherman was about 18.9 L compared to 26.1 L and 23.6 L of Makarska and soles fishery.

Earnings data shed light on the reason of migrating of *Chioggiotti* along all the Adriatic waters, being the economic factor the most important (as always it is for men’s behaviour) that induced fishermen to risk their life and to spend so much time far from their home place. In fact, as stated before, fishermen mainly belong to the proletariat, they were illiterate and very poor having no other source of money but fishery. Ruiblas, an old *Chioggiotto* fisherman, said (Bighin, 1991. Free translation): "When, after twelve weeks, we came back at home from Dalmazia excited to see our sons, our parents and wife, with the view of the port got down tears on throat and shoved paddles almost breaking them...We came at home and everything was perfect. Perfect for the first three days! At the first day, there was food. At the second one, maybe there was still food. At the third one your wife start talking to pledge the wedding ring...and your heart hold. At the fourth one, you understood by yourself that was already time to go back at sea...not to be a load for your family, to decrease the number of hungry mouths!".

In Chioggia and Venice, before Veneto Fishing and Aquaculture Society was established fishermen were excluded from invalid funding of mercantile marine, since they were not classified as navy men, and from all kind of public welfare (Ateneo Veneto, 1903). For this reason Levi Morenos strongly defended fishermen proletariat and its interests during all his life. For instance, in the occasion of the Trade and Navigation Agreement renew (1903) between Italian Realm and Austro-Hungarian Empire, presented a Memorial to the Italian Govern pointing out the economic importance of fisheries in the Eastern Adriatic Sea for all Italian fishermen. Summarising his report, Levi Morenos said that fishing activities was still livelihood fishery and not industrial and migrations allowed to close annual loop of work. The physical and biological unity of the Adriatic
Sea was the cause of the need to fish in both the Eastern and Western coastline. Fishermen that used to fish just in one part of sea would not gain enough earnings to live all the year long. He stated (free translation) that: “Definitely worst would be consequences for Italian fishermen (almost only Chioggio) if they would loose suddenly their traditional eastern fishing sites (...) Cocchie and Bragozzi are essentially Chioggio’s fishing gears and boats that represent the only “bread and butter” of these bold Adriatic workers (...). It is necessary to note that Bragozzi are excessively large to fish onshore and excessively small to fish continuing in high waters without being supported by Eastern Coast side (...) so our fishermen would be like a small landowner robbed of its fields, but with gears specific just to cultivate that field (...). The economic consequences of no migrating would be either direct and indirect. Directly, fishermen that used to migrate along Eastern coastline, should fish along Romagna and Marche already exploited by an excessive number of operators, or, on the other hand, they would leave fishing activities and become a port worker competing with the already existing port workers. Somebody else could leave the Italian Realm and become an Austro-Hungarian citizen to continue fishing activities. Indirectly, consequences could be crisis on shipyards and conflicts between fishermen or port workers caused to the invasion of their quiet situation”.

As confirmed by the data previously shown it is clear that migrations were necessary to assure earnings for all the year. Hence the poor economic condition of fishermen is the first answer to the question of why fishermen were used to migrate.

But if we wish to better understand the pattern of such migrations, we must take into account the Adriatic Sea morphology and the spatio-temporal distribution of commercial species.

The Adriatic coastline morphology is remarkably different between its Western and Eastern parts. Faber described Italian coastline as a flat and shallow habitat, characterised by sandy banks and morass, being constantly exposed to winds, especially scirocco from South-East and bora from the North-East. This area is characterised by the total absence of natural ports, a part estuarine areas as like lagoons and river mouths. On the contrary, the Eastern Adriatic coast is high and uneven, and presents many islands and rocks, that acts as barrier from winds and waves. Several fjords, bays and gulfs are natural ports and consequently this coastline is named “all a port” (Faber, 1883). Faber said that Chioggio preferred to fish in the Eastern coastline mainly during Fall and Winter to conjure shipwreck that were common in these seasons, characterised by bad weather. For instance, Ferrari relates (1998) that in ten years, 1882-1892, 106 shipwreck occurred in inshore fishery and 47 in high waters; 25 fishermen died in just one night the 13th of February 1889.
Anyway, *Chioggiotti* wished to fish in the Eastern coastline also for other reasons. The rocky coast habitat hosted many species repaired in slits and rifts. Especially some species of valuable rock fish or crustaceans as like lobster. Furthermore some species could be found only in restricted areas, as like the Norway lobster (*Nephrops norvegicus*) which were common in the Quarnero Gulf as also reported by Faber.

The presence of rare and valuable species, however, can not be a substantial explanation for the migration of such an high number of fishing vessels. In fact *Chioggiotti* were used to perfectly overlap their fishing strategy to the spatial distribution of the most profitable and abundant species, which migrates according to water temperature and spawning period. For instance pelagic species as like sardines and mackerels were known to change their spatial distribution in order to reach warmer waters. During Spring and Summer they were spread in all the Adriatic Sea, especially in inshore and warm waters, whereas in the cold period they migrated southward along the Eastern Adriatic side, where deeper waters maintained warm temperatures. In fact in Winter, along the western coastline, water temperature reaches about 5-6 °C, whereas in the eastern deeper side it is about 10-12 °C. Accordingly Faber noticed that sardines were mainly caught twice per year (April-May and September-November) mainly along Quarnero Gulf and Dalmazia coastline and completely disappeared during remaining time, when temperature is either too low or to high.

Common sole, another major target species in the *Chioggiotti* fishery, is well known to migrate, according to age class, to the Istrian coastline for spawning between November and March. After spawning the common sole larvae and juveniles migrate from this area to reach the estuarine system (lagoons and river mouths) in the western coastline which represents their nursery areas. At the end of fall, common soles will leave the inshore grounds towards deeper sites for spawning; accordingly the *Chioggiotti* practised sfogioni fishery during Winter due to the high density of this species along Istria.

Apart from economic, practical and ecological considerations another important and rooted factor, the historical, one substantially contributed to the developments of *Chioggiotti*'s habits to exploit the eastern Adriatic Sea. In fact in the Serenissima period, all the northern and Eastern sides of Adriatic Sea were under the Venetian rule, and seamen, that were used to trade goods between these area considered it as their country. This situation became a secular habits and tradition, even when political changes occurred. *Chioggiotti* were used to sail through the whole Adriatic Sea for centuries and perfectly knew all the ports, the sea bottom features and species’ migrations. Furthermore, they developed several kind of
fishing gears which they adopted in to fishing grounds features (Levi Morenos, 1916). But Chioggiotti’s expertise and bravery were also the origin of envy in immature Austro-Hungarian fishermen (as said Giorgio de Hutterot, founder of Fishery Austrian School) and, adding economical interests, the relationships between these populations became a conflict.

The consequences of fishery migration were manifold and at different levels, determining conflicts between fishermen, politicians and between scientist from Italian Realm and Austro-Hungarian Empire. From the Chioggiotti’s point of view, migration assured earnings and, during Fall and Winter, more safety in fishing activities. From the Austro-Hungarian perspective there were both benefits and disadvantages. The disadvantages were mainly inherent to professional jealousy of Austro-Hungarian fishermen and to economic losses. But the advantages were those for populations that were furnished with huge quantity of fish whose price was cheap compared to the local production. Moreover, the catch composition was more diverse and caught species included both valuable species for rich people, but mainly, cheaper species for poor people.

Krisch wrote (Neptunia, 1897/8, free translation): “Chioggiotti fishermen are overactive and prompter as compared with local fishermen; that is proved looking at Bragozzi running about coastline almost all the year furnishing abundantly markets… We can see in Trieste, Rovigno, Pola, Fiume, Zara and Spalato market, when a Chioggiotti’s boat arrives, people crowds and everybody go back home with their fish.”

The distribution of fishermen in the Empire waters confirm, if needed, Chioggiotti’s preponderance. As already mentioned the Chioggiotti and Austro-Hungarian fishermen, according to Gorizia Agreement (1884), could only fish beyond one mile from the Eastern coastline or at depth bigger than eight meters; Austro-Hungarians could fish everywhere also into one mile at any depth. For instance considering data concerning six fishing grounds (Trieste, Pola, Rovigno, Lussino, Zara, Spalato) in 1911 (Pastrovic, 1913), Chioggiotti were fairly more active than Austro-Hungarians: 272 Austro-Hungarian fishermen were used to fish in Trieste, Rovigno and Lussino into one mile and only 176 in Trieste and Lussino beyond the one mile boundary. In comparison only 30 Chioggiotti fished in Rovigno inside the one mile limit whereas 1390 fished beyond it. Additionally, the catch data along Croatian coastline in 1878-9 (Faber, 1883) confirm the importance of Chioggiotti for contributing to the fish catch in this area: during Summer they fished 100% of the whole of crustaceans catch, 34.6% of molluscs, 43.9% of sharks and rays and 19% of bony fish; in Winter they fished 99.8% of crustaceans, 82.6% of molluscs, 95.9% of sharks and rays and 85.1% of bony fish.
Chioggiotti and Austro-Hungarians fishermen had different psychology. As stated by the Austrian adviser Anton Krisch said (Neptunia 1904): "It needs organisation, instruction and a constant propaganda in order to let fishermen being satisfied to go at high sea even if they don’t realise always a plentiful catch; they hasn’t to lose patience. Fishermen have to be trained.”

Krisch and Hutterot allowed Chioggiotti to fish in the Austro-Hungarian waters only because the admitted that local fishermen were an immature fishermen class as Hutterot underlined during the General Congress of Fishery Austrian Society (24 May 1903): “Empire hasn’t local fishermen that practice really profitable Chioggiotti’s fishery. We aren’t able to introduce high sea fishery because of immaturity of our fishermen class. Local markets are provided poorly by our fishermen, is enough remember plaints moved by politics about famine of fishes”

Domenico Razza wrote in Neptunia (1983): “Chioggiotti aren’t accepted by local fishermen because of natural jealousy, but they are strongly accepted by the remaining population because they supply large quantity of fishes cheaply and because, making their commissions in foreign port, permitted to local dealer to make further profit”

The Chioggiotti were often subjected to vandalism by local fishermen. For instance, as reported in the journal “Adriatico” in 5 January 1902: “….Croats threw rocks against Italian Bragozzo named Maria Immacolata and broke moorings. The boat beached cause of the wind and was seriously damaged…”. Another example can be found in Neptunia (1894): “ Last January, some Italian fishermen stand violence for profession jealousy, close to Brazza island…”.

Even the warrantors of laws obstructed Chioggiotti’s fishery as referred by Neptunia (1904, free translation): “Antonio Damic, fishery responsible in Narenta, past time start to oppress Chioggiotti, blaming them of imaginary pogroms. Damic has accused Chioggiotti six time in eight days. Dalmatian population, instead, is alarmed for possible ousting of Chioggiotti (…) Without the Chioggiotti, Dalmatian population should pay fishes two crown per Kg, in contrast to the actual situation wherein can eat large quantity of fishes and cheaply…”.

Austro-Hungarian authorities, like politician but also scientists, utilised every kind of strategy to prevent Chioggiotti fishery along the Empire coastline. In particular, since they did not obtain anything more that the one mile exclusion, they lean on the prohibition of using damaging fishing activities (dynamite or harmful gears for juveniles) as written in the Gorizia Agreement. They accused Cocchia, which was used only by Chioggiotti, to be disruptive for fish eggs, juveniles and for aquatic plants that constituted refuges for animals. Levi Morenos, on his Memorial (1903), called on scientist observations that demonstrated that juveniles were not destroyed by the Cocchia, but by dynamite fishing and nets dragged by coast, fishing systems that Chioggiotti didn’t practice in their activity. Levi Morenos add that a total prohibition of otter trawl similar to Cocchia, enacted
for many years in France and England, didn’t improve situation, but on the contrary fishing catches decreased.

“Sea bottom” said a Chioggiotto fisherman “is moved by our fishing gear and preserves its fishing level and don’t cover itself with “zucche, teste, olive, zuccai, caneluzzi” (these are the names of several invertebrates, which has not commercial value) that make it barren. The bottom has to be moved, plough, to give plentiful catches” (Neptunia, 1904).

In conclusion Chioggiotti’s fishery migration represented between the 1866 and 1915 the main source of incomes for proletarian fishermen which risked their life sailing along the Adriatic Sea, especially on its Eastern side. This fishing activity was the cause of several conflicts with the Austro-Hungarian authorities but was substantially accepted since it provided cheap food for the local populations, whose fishermen class was not or, if you wish, not enough brave. The attitude of Chioggiotto to migrate for fishing was based on their historical habits of considering the whole Adriatic as their own country and started at least at the end of the XVIth Century. Although illiterate, they showed to perfectly know the ecology and spatial distribution of species in relation to environmental fluctuations, being able to maximise their catch throughout the year. This knowledge has been recently named “Traditional ecological knowledge”, which means that fishermen, due to their experience, are probably the most deeper experts of the marine fauna secrets. The analysis of their habits, the description of catches and fishing strategies, is regarded as a way to better understand which was the status of the Adriatic Sea fishery resources and ecology prior to the industrial fishery, a topic which is regarded as fundamental by marine ecologists to ensure a better management of this area. This paper wish to contribute to this challenging study.

Conclusion
All the Adriatic Sea fishery, a part from some inshore activities, drastically stopped during the I and the II World War. Between these events the Chioggiotti maintained their prevalence at least in the Northern Adriatic Sea fisheries. But after the Yugoslavia country was born, the Eastern Adriatic Sea coastline, up to twelve miles from the sea shore, was interdicted for foreigners fishing activities. Chioggiotti in a decade dismissed their Bragozzi, adopting larger engine propelled fishing vessels and more impacting fishing gears. After a period of increase in the catches they are now facing a strong crisis, due to the excessive fishing effort and capacity of their fleet. On the contrary, the East Adriatic waters are still productive, probably due to the fact that local fishermen maintained a small scale fishing activity. Somehow, their low attitude to fishing preserved their environment. Sometimes during bad weather, but very rarely, some Chioggiotti are used to go fishing in the Croatian waters as they say “robbing”. Many species they were used to catch a hundred of years ago
or even before are currently imported, for instance, from the Atlantic Ocean. The time when Chioggioti dominated fishery in a plentiful Adriatic Sea has for sure finished.

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