

Pleuronectes platessa, a ghost fish in the Mediterranean Sea?

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SUMMARY: European plaice *Pleuronectes platessa* often appears in ichthyological check lists for the Mediterranean Sea, as well as in regional field guides and even in some official national landings statistics. However we have not found a single ichthyologist or fisheries biologist who has actually observed this fish in the Mediterranean. The ichthyologic sources available, from classical antiquity to recent times, were checked in order to follow the track of the citations (i.e. true field observations or citations of former authors), and to try to detect misidentifications, if any. Few of these citations appear to be reliable and misidentifications with flounder *Platichthys flesus* are frequent. Recent scientific trawl surveys have not reported any observations of plaice. The statistics provided by France to the FAO with positive catches of *P. platessa* appear to be misidentifications of *P. flesus*. Plaice may have been present in some areas of the Mediterranean in the past, as a result of climatic changes related to the ice age. However, the species seems to be absent now. We propose that this species should be removed from the ichthyofauna records of the Mediterranean.

Keywords: *Pleuronectes platessa*, plaice, Mediterranean Sea, Pleuronectidae.

RESUMEN: *PLEURONECTES PLATESSA*, UNA ESPECIE FANTASMA EN EL MEDITERRÁNEO? – La especie *Pleuronectes platessa* aparece a menudo en los listados de peces del Mediterráneo, guías de identificación de especies mediterráneas, e incluso en estadísticas oficiales. Sin embargo no hemos encontrado un solo ictiólogo o biólogo pesquero que la haya observado en dicho mar. Se han comprobado las obras de ictiología desde la antigüedad clásica hasta nuestros días con el fin de seguir la pista de las citas, por si son auténticas observaciones de campo o citas de autores anteriores, y tratar de detectar errores de identificación en caso que los haya. Pocas citas aparecen como verdaderamente confiables, la mayoría no lo son. Las confusiones con *Platichthys flesus* son frecuentes. Las campañas científicas recientes tampoco han proporcionado ninguna observación de *Pleuronectes platessa*. Las estadísticas que Francia ha proporcionado a la FAO con capturas de esta especie, resultan ser confusiones de identificación con *Platichthys flesus*. *Pleuronectes platessa* podría haber estado presente en algunas áreas del Mediterráneo en el pasado como resultado de los cambios climáticos relacionados con la pequeña edad del hielo. No obstante parece que en la actualidad es ausente. Proponemos eliminar la especie de los registros de la fauna ictiológica del Mediterráneo.

Palabras clave: *Pleuronectes platessa*, platija, mar Mediterráneo, pleuronéctidos.

INTRODUCTION

European plaice *Pleuronectes platessa* L., 1758 is a very important commercial flatfish in the North Sea. However plaice is almost unknown in the Mediterranean, and the transport and marketing of this species in the area is very rare or absent. Although plaice is normally easily distinguished from related species, such as flounder *Platichthys flesus* (L., 1758), there can be misidentifications between these species, especially

if the nominal identification was based purely on the presence of orange spots (which is not a diagnostic character for plaice).

Since many ichthyologists and fisheries biologists working in the Mediterranean have neither caught nor seen this species in the area, we question its presence in the Mediterranean Sea. In this paper we try to track the path of this fish in the Mediterranean and conclude that it is now absent and may never have occurred in the area.

CLASSICAL ANTIQUITY

According to Thompson (1947) the Greek and Latin classic writers do not mention the plaice. Some flatfish appear in the ancient Greek texts, βουγλοσσα, εσχαρασ, ρομβος, and ψηττα, corresponding very clearly to some of the most common flatfish in the Mediterranean: *Psetta maxima*, *Scophthalmus rhombus*, *Solea solea* and other small soleids, and more doubtfully to *Bothus podas* and *Platichthys flesus*. The latter species is the only pleuronectid that seems to appear in those ancient writings.

Aelian (XIV, 3) mentions a flatfish named στρουθους (this word does not appear in Thompson 1947), which for Belon (1555) is synonymous of ψηττα and “passer” which translates to French as “plie”, that is *Pleuronectes platessa*. This word was translated into Spanish as “solla”, that is *P. platessa* (edited by Biblioteca Clásicos Gredos, in 1984).

Pliny the Elder mentions “passeres” (IX, 72), likely a pleuronectid, translated as *Pleuronectes platessa* in several instances (i.e. the French translation edited by Littré, Dubochet 1848, and the English translation published by the Loeb Classical Library in 1983, 2nd edition,¹ but adding the note “or flounder; the identification is doubtful”).

However, the modern translation of several flatfish into *Pleuronectes platessa* is not well founded on taxonomic work.

Also, in the paintings and mosaics representing fish, few flatfish appear, and the only case we found is the mosaic exhibited in the Sousse Museum (Tunisia) where in the left top of the mosaic a sole-like flatfish occurs. To our knowledge, *Pleuronectes platessa* does not seem to appear in writings or visual representations during the classical period.

RENAISSANCE ICHTHYOLOGISTS

After a long gap, in the 16th century 5 notable ichthyologists were active in the area, including Belon (1553, 1555), Rondelet (1554), Gesner (1558), and Aldrovandi (1613). The fifth author, Salviani (1557), did not include flatfish in his book. The identification of the fishes presented by these ichthyologists is not always easy. Some post-Linnean authors have attempted to do so, but complete agreement has not been reached.

Belon (1555) described 9 species of flatfish. *P. platessa* corresponds to Passer (*Passer vulgaris* and *Quadratulus*, pp. 141-143) according to Lacepède (1802) and Günther (1862). However, there was no geographical reference.

Rondelet (1554) discussed 15 flatfish species. According to Artedi (1793), Valmont de Bomare (1800),

Lacepède (1802) and Günther (1862) *Pleuronectes platessa* corresponds to the “Alia passeris specie”, for which the author mentions that it is caught in the Atlantic.² Artedi (1792) also attributes “passer” (pg 316) to *P. platessa*, but for Delaroche (1809) this species corresponded to *Platichthys flesus*.

Gesner (1558 and 1604) presented about 20 flatfish species. All later authors seem to use the second edition from 1604. According to Artedi (1793), Lacepède (1802) and Günther (1862), *Pleuronectes platessa* corresponds to “passer”, but for Artedi (1793) and Valmont de Bomare (1764, 1800) it corresponds to “quadratulus”. In both cases Gesner mentions the Atlantic (*Oceano*) as the main place for these species.

Aldrovandi (1613) presented 15 flatfish. All subsequent authors (Artedi 1793, Valmont de Bomare 1800, Lacepède 1802, and Günther 1862) agreed that *P. platessa* corresponded to *Passer laevis*. In terms of this fish, he mentioned only countries bordering the North Sea and the English Channel (Belgium, the Netherlands, France and England). Salvador (1722) listed 142 fishes from Catalonia and *Pleuronectes platessa* was absent (Leonart and Camarasa 1987).

During the period in which Minorca belonged to the English Crown, two publications that included fish lists were published: Cleghorn (1751) did not mention *P. platessa* or any similar species, and Armstrong (1752) only included English names³:

Valmont de Bomare (1764) gave the name “grande plie” to *P. flesus*, present in the coastal lagoons of Montpellier, and “petite plie” or “carrelet” to *P. platessa*, “characterized by yellow or redish spots”.

THE POST-LINNEAN ICHTHYOLOGISTS

Pleuronectes platessa has been cited under a number of synonyms. Some authors include the pre-Linnean synonyms (Delaroche 1809, Günther 1862), others only Linnean names (Norman 1934, Hureau and Monod (eds.) 1973, Eschmeyer 2010). However there are some discrepancies regarding the species identification of the pre-Linnean ichthyologists. In this paper we will only use the name *Pleuronectes platessa*, regardless of the synonym used by the author.

Some ichthyologists describe *P. platessa* only for the Atlantic and do not give common names from Mediterranean countries. Among them, Bloch (1801), Lacepède (1802), Bonaparte (1846) and Steindachner (1868). Cuvier and Valenciennes (1828-1849) did not include flatfish in their work. Delaroche (1809) did not find *P. platessa* in the Balearic Islands but, in addressing *Pleuronectes flesus* (synonym of *Platycthis flesus*), he pointed out that the two species have been

1 (...) ut rhombi, soleae ac passeris, qui ab rhombis situ tantum corporum differunt – dexter hic resupinatus est illis, passeris laevis (...), that is “the turbot (*rhombus*), the sole (*solea*) and the passer, which differs from the turbot only in the posture of its body—the turbot lies on its right side and passer on its left”

2 Huius magna copia in Oceano capitur

3 The Plaice, Sole, Dab, and Flounder, are more rare; and it is great Pity these People do no catch more of them, since they are certainly as good as any in the World.

confused.⁴ Risso (1810) cited *Pleuronectes platessa* as present in the Mediterranean, identified as “P. Plie. Lac. *P. Platessa*. Lin. (Sollo de Plano)” (sic) giving the reference of Bloch pl. 42, which actually corresponds to *Pleuronectes platessa*. This is the first and most reliable citation of this species occurring in the Mediterranean.

Weyler (1854) published a list of the fishes of the Balearic Islands, adding Spanish and Catalan names when known. He mentions *Pleuronectes platessa*, with the Spanish name (“platija”) but no common name in Catalan. Graells (1864) attributed the Catalan name “palaya” to *Pleuronectes platessa* although he did not specifically mention its occurrence in the Mediterranean. That name (with obsolete spelling) is a generic name for many flatfish (“palaia”) in the geographical area with Catalan as a main language.

Doûmet (1869) mentioned “la plie” (*Platessa passer*) as the only pleuronectid species occurring in the brackish waters along the Languedoc coast. According to Bonaparte (1846), *Platessa passer* corresponds to the species *Platichthys flesus* and the French name should be “flet”. However, in a previous paper (Doûmet, 1860) this author had presented *Platessa passer* under the common Occitan name “plana” which corresponds to *P. flesus*, while the word “plie” is not mentioned at all.

Barceló (1868) listed *Pleuronectes platessa* in his list without a common Catalan name, but he mentioned that the citation was based on Weyler (1854) and that he had never seen any specimens. Steindachner (1868) questioned the presence of the species in the waters of the Southern Spanish Atlantic, as cited by Machado (1857), and suggested that it was based on misidentifications of *Platichthys flesus*, which did not appear in his list.⁵ The confusion between these two pleuronectid species could have been a recurrent problem in the Mediterranean. Moreau (1881) cited *P. platessa* as present in the Atlantic Ocean but not for the Mediterranean Sea. Faber (1883) cited *P. platessa* in the Adriatic on the basis of two specimens bought at the market in Venice.⁶

Navarrete (1899) considered that *P. platessa* was “more common in our Atlantic than in the Mediterra-

nean, where [it] is almost rare”.⁷ In a table he added the same common Catalan name given by Graells (1864). In the bibliography he referred to the accounts of Graells (1864), Cisternas (1867) and Barceló (1868). Pérez Arcas (1923)⁸ also took the citation and Catalan name from Graells (1864). De Buen (1926) reported the species for the Balearic Islands without a local name, and it is likely that he took the citation from Barceló (1868). Fage (1907) collated all the fish listed by the previous authors, including Graells (1864) and Barceló (1868), and *P. platessa* was included in his catalogue.

Norman (1934) provided one of the most reliable notices that *Pleuronectes platessa* can occur in the northern Adriatic Sea. A specimen was reported for Trieste (the same as cited by Faber, 1883) and another, with a question mark, for Naples.⁹ De Buen (1935) reported *P. platessa* as occurring in the Balearic Islands, on the basis of his previous account (De Buen 1926) but now without details of the sources he used. Padoa (1931-1956) listed *Pleuronectes platessa*, but using only Atlantic references and he stated explicitly that it was extreme rare in the Mediterranean and absent from Italian waters.¹⁰

Lozano Rey (1960) did not report *Pleuronectes platessa* from the Mediterranean and, although he did report a specimen bought in Valencia market, he made it clear that it originated from the Bay of Biscay.¹¹ Bini (1965, 1968) reported the occurrence of *Pleuronectes platessa* in the Mediterranean, but admitted that it was extremely rare.¹²

The CLOFNAM (Hureau and Monod (eds.) 1973), noted the presence of *P. platessa* in the Black Sea, but without reference. There is no other document reporting the occurrence of this species in that area.

7 “Más común en nuestro Atlántico que en el Mediterráneo, donde es casi rara.”

8 Actually finished in 1865, but published in 1923 by Lozano Rey.

9 “The occurrence of the Plaice in the Adriatic is difficult to credit and requires confirmation. In 1878, Trois found two specimens in the fish-market at Venice, and the only other record of the species being found in this region is the statement by Jordan and Goss (1889) that they had examined examples from Trieste (Coll. Salmin). One of these specimens has been sent to the British Museum by the Museum of Comparative Zoölogy, through the courtesy of Prof. T. Barbour, and proves to be a typical *Pleuronectes platessa*”

10 “Specie in Mediterraneo rarissima, e nelle acque italiane probabilmente assente. Ci limiteremo ad accennare brevemente as suo sviluppo, ormai ben conosciuto grazie alle ricerche che numerosi AA. hanno condotto sulle coste Occidentali Europee, dove questa specie è abontantissima ed economicamente molto importante.”

11 “La especie es propia de las costas septentrionales y occidentales de Europa, hasta el estrecho de Gibraltar, existiendo también en el Mediterráneo occidental, aunque no parece que sea muy abundante en este mar. (...) En nuestra colección de estudio hay [un ejemplar] que adquirimos en el mercado de Valencia, pero procedente de un puerto cantábrico.”

12 Bini (1968) writes “In Italia assolutamente occasionale” and “E’ stata trovata anche nel Mediterraneo alle Baleari e sembra a Napoli e nell’alto Adriatico. E’ molto dubbia però la presenza nelle nostre acque e in ogni caso estremamente rara”.

4 J’ai trouvé au marché de Barcelonne ce poisson, qui se rapproche du flet, à quelques égards, mais qui en diffère par plusieurs caractères. Je crois que c’est la première espèce de *passer* de Rondelet; espèce que l’on a fort improprement rapportée, d’après Willugbey et Artedi, au *pleuronectes platessa*. Ceux qui en verront beaucoup d’individus, pourront reconnoitre si les caractères que je vais indiquer sont constats et suffisants pour faire regarder cette espèce comme distincte du flet de l’Océan.

5 Steindachner notes: “Nach Machado kommt *Pleuron. platessa*=*Pl. vulgaris* Cuv. bei Cadix vor; icht selbst habe mir kein Exemplar dieser Art verschaffen können und vermthe, daß Machado *Pl. platessa* mit *Pl. flesus* verwechselt haben dürfte, da letztere Art, die bei Cadix und Gibraltar eben nicht selten gefischt wird, in Machado’s Katalog nicht angeführt ist.”

6 “Two specimens were found by Professor Trois in the fish market at Venice; these appear to be the only ones hitherto caught in these seas.

Tortonese (1975) is quite clear regarding the presence of *Pleuronectes platessa* in the Mediterranean. He believed that the nominal records were more likely due to confusions with *Platichthys flesus* or based on specimens seen in the markets than an actual presence in the Mediterranean.¹³

Only authors mentioning or discussing the occurrence of *Pleuronectes platessa* in the Mediterranean are presented above. However, there are many other authors who in their lists and catalogues do not cite this species. Table 1 lists those bibliographic references including and excluding *Pleuronectes platessa* in the Mediterranean.

THE GUIDES

Two very prestigious guides suggest the presence of *Pleuronectes platessa* in the Mediterranean. Nielsen (1986) gave a distribution area continuously covering the whole Spanish and French coast line and the Italian Ligurian and Tyrrhenian Seas, as far as the Messina Straits. Fischer *et al.* (1987) gave its distribution area as covering the whole Spanish coast, with an uncertain distribution (indicated with a dotted line) along the French coast and the northern part of the Italian Adriatic Sea. The presence of *Pleuronectes platessa* is pointed out by some other general or local lists, popular guides and field guides, but some others do not mention this species at all. For an extended record of these references see Table 1.

SCIENTIFIC TRAWL SURVEYS

A number of scientific trawl surveys have been carried out in the Mediterranean. MEDITS is a systematic demersal trawl survey undertaken by the European countries since 1994. According to Désaunay *et al.* (2006), plaice has never been caught during bottom-trawl surveys in recent years along the northwestern Mediterranean in the MEDITS cruises. After 30 years of sampling in the northern and Central Adriatic (including cruises targeting flatfish with a specific gear) not one specimen of *Pleuronectes platessa* has been seen or cited (Giovanardi, com. pers.). According to Piccinetti (com. pers.), the only peluronectid species present in the Adriatic Sea is *Platichthys flesus*.

LANDING STATISTICS

Crespo *et al.* (2001) published the vernacular names used in the fish auctions in Spain. They did

13 “è molto dubbia l’esistenza di *P. platessa*, nei cui riguardi non possediamo che scarse notizie, vecchie e malsicure. Carus (1893) la cita per la Sicilia, Venezia e Trieste, Fage (1907) per le isole Baleari. Non si può escludere che questa notissima specie dell’Atlantico settentrionale penetri anche nelle acque mediterranee, ma assai maggiore è la probabilità che in passato vi siano state confusioni fra *P. platessa* e *P. flesus* o che si siano visti sui mercati individui di provenienza atlantica.”

TABLE 1. – References of lists of Mediterranean fishes with and without *Pleuronectes platessa*, since the 18th century.

With <i>P. platessa</i>	Without <i>P. platessa</i>
1752 Armstrong ‡	1722 Salvador
1810 Risso	1751 Cleghorn
1854 Weyler	1801 Asso
1864 Graells	1802 Orellana
1868 Barceló	1802 Lacepède**
1869 Doûmet (?)	1809 Delaroché*
1883 Faber	1814 Ramis
1899 Navarrete&	1846 Bonaparte
1907 Fage	1860 Doûmet
1921 Pérez Arcas (written in 1865)	1867 Cisternas
1926 De Buen	1868 Steindachner**
1934 Norman	1881 Moreau**
1935 De Buen	1882 Reguis
1965 Bini	1894 Gourret
1968 Bini	1903 Ferrer Hernández
1968 Luther and Fiedler	1904 Sánchez Comendador
1984 Campbell	1905 Calvet
1986 Nielsen	1906 Ferrer Aledo
1987 Fischer <i>et al.</i>	1913 Gibert
1987 Juana and Juana	1916 Boscà
1990 Sostoa	1920 Borja y Goyeneche**
2001 Crespo <i>et al.</i>	1921 Pruvot
2001 Mercader <i>et al.</i>	1921 Pardo
	1931-1956 Padoa*
	1960 Lozano Rey* and **
	1961 Palombi and Santarelli
	1975 Tortonese
	1979 Centelles
	1981 Nadal*
	1986 Riedl
	2006 Centelles

(?) Probably a mistake in the common name.

‡ Not clear, since it uses the English nomenclature.

& Implicit citation of *Pleuronectes platessa* by giving a name in Catalan (a language only present in the Mediterranean).

* Explicit citation of *Pleuronectes platessa* as an absent species or not seen caught in the Mediterranean.

** Cited only for the Atlantic.

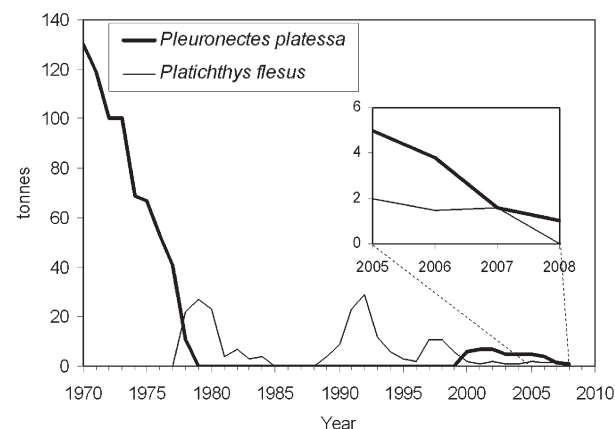


Fig. 1. – French catches of *Platichthys flesus* and *Pleuronectes platessa* in the gulf of Lions as reported to the FAO (FAO-GFCM 2010).

not report *Pleuronectes platessa* for any Mediterranean harbour. In a further edition (Crespo and Ponce 2003), *Pleuronectes platessa* appears with vernacular names for Catalonia, but it seems that for this edition the authors included names from bibliographic sources.

The FAO database of catch statistics (FAO-GFCM 2010) for the Mediterranean (released in January 2010) reported catches of *Pleuronectes platessa* only for France in the Gulf of Lions. France also reports catches of *Platichthys flesus* (Fig. 1) along with other countries (Italy, Slovenia, Albania and Spain). The collective name of Pleuronectiformes cannot be used because it refers to the order and includes all other flat-fish families.

A test on the species naming system in the “criée” of Sète was conducted, requesting that any specimen of “plie” (which contributes to the nominal statistics) observed in the landings be saved. Several fishermen and scientific observers conducting regular samplings of the landings in the Gulf of Lions were also approached. On all the occasions, ten visits involving about 30 specimens, those named “plie” were actually “flet”, and no confirmed observations of true “plie” were made. Specimens of “flet” are named “plie” also in Marseille and Grau du Roi. Furthermore, we were informed that “plie” occurs in the lagoons along the French coast, and this estuarine habitat would be the normal environment where *Platichthys flesus* (the “flet”) would be expected to occur.

GEOGRAPHICAL DISTRIBUTION AND CLIMATE CHANGE

Pleuronectes platessa is a boreal species, and its occurrence in the Mediterranean Sea seems doubtful. However, the cold period known as the Little Ice Age (LIA), could have played some role in the changes of its geographical distribution. It is likely that the species was not present in the Mediterranean during the long warm period embracing the ancient (classical) and medieval ages. However, during the LIA (roughly 1500-1850), its distribution range may have expanded further to the south, and it could have entered through the Straits of Gibraltar following the northern shelves of the Mediterranean. At the end of the LIA, relict populations may have persisted in the cooler parts of the region (e.g. the Gulf of Lions and the northern Adriatic). Thus, the occurrences reported by Risso (1810) and Norman (1934) could correspond to actual specimens of *P. platessa* taken from declining populations before their disappearance.

CONCLUSION

It seems that the classical authors do not mention *Pleuronectes platessa* at all, but probably referred to *Platichthys flesus*, and some translations have clearly confused the two species. The renaissance ichthyologists identified *P. platessa*, but never explicitly as occurring in the Mediterranean. The most prestigious ichthyologists to cite *Pleuronectes platessa* in the Mediterranean are Risso (1810), De Buen (1926, 1935), Norman (1934), Nielsen (1986) and Fischer *et al.* (1987). Although other authors (Weyler 1854,

Graells 1864) mention *Pleuronectes platessa* in Spanish publications, these authors are not eminent ichthyologists and their reports are doubtful. As Tortonese (1975) suggested, some nominal accounts may have been based on misidentified *Platichthys flesus*. Other authors (e.g. Barceló, 1868; Navarrete, 1898) have simply reiterated these accounts. This may also be true for the 20th-century Mediterranean guides, including Nielsen (1986) and Fischer *et al.* (1987). In Table 1, the most significant publications of the Mediterranean fish fauna are classified according to the presence/absence of *Pleuronectes platessa*.

It cannot be shown that *Pleuronectes platessa* has never occurred, and it may indeed have occurred in the past in the cooler waters of the Mediterranean (north-western basin and northern Adriatic) as a response to changing environmental conditions. However, it seems that in recent years this species has not been present. Several authors have explicitly remarked on its absence in the Spanish Mediterranean (Nadal 1981, Duran 2009), and others claim that they have not seen this species in the same area (Delaroche 1809, Lozano Rey 1960).

As a conclusion we propose removing *Pleuronectes platessa* from the ichthyofaunal lists for the Mediterranean. Even if it was present in the past, which is possible but doubtful, there is no recent scientific evidence to confirm the presence of this species in the Mediterranean. Consequently, on-line guides and catalogues, as well as landing statistics, should be corrected accordingly.

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