ARE EU LOG-BOOKS SUITABLE TO COMPUTE SIZE FREQUENCIES OF BLUEFIN TUNA CATCHES OF THE FRENCH PURSE SEINERS?

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SUMMARY

The 2001 size composition of Atlantic bluefin tuna catches of the French purse seiners has been estimated from the EU log-books and appears roughly in agreement with those estimated from the local seafood traders between 1982 and 1998. However, the accuracy of the 2001 size composition remains uncertain because of a lack of a standard protocol and of sampling on catch coming from heterogeneous and/or multiple shoals. Regarding the spatial and temporal dynamic of the French fishery, an observer program should be implemented to correct and validate the size frequencies of these catches.

RÉSUMÉ

La composition en taille des captures 2001 des senneurs français visant le thon rouge atlantique a été estimée à partir des données des livres de bord européens et est apparue conforme à celles estimées entre 1982 et 1998 à partir des données de vente des mareyeurs. Cependant, l'absence d'un protocole standard et le manque d'information pour estimer la composition en taille des pêches faites sur bancs hétérogènes ou bancs multiples font que la composition en taille 2001 est probablement biaisée. Au vu de la dynamique spatio-temporelle de la pêcherie française, seul un programme d'observateurs à bord pourrait permettre de corriger et valider la composition en taille de ces captures.

RESUMEN

La composición por talla de las capturas de 2001 de los cerqueros franceses cuyas operaciones se dirigen al atún rojo atlántico se ha estimado a partir de los datos de los cuadernos de pesca europeos y a escala general parece conforme con las estimaciones de 1982 y 1998 provenientes de los datos de venta de mayoristas. Sin embargo, la ausencia de un protocolo normalizado y la falta de información para estimar la composición por talla de la pesca realizada sobre bancos heterogéneos o bancos múltiples hacen que la composición por talla en 2001 esté probablemente sesgada. Considerando la dinámica espaciotemporal de la pesquería francesa, sólo un programa de observadores a bordo permitiría corregir y validar la composición por talla de estas capturas.

KEY WORDS

Atlantic bluefin tuna, catch statistics.

1. INTRODUCTION

Up to the early 1990s, the French purse seiners (PS) typically targeted juveniles bluefin tuna (BFT) in the Gulf of Lion and the Ligurian Sea and land their catches in many different sites along the French Mediterranean cost at anytime of the day and season (Farrugio 1981). Therefore, the size frequencies were estimated through the sale records of the French local seafood traders, which allowed

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to recover the size composition of most of the French catches from the late 1970s to 1993 (Farrugio 1981; Liorzou and Bigot 1999). The accuracy of this sampling strategy has been recently investigated and validated by the EU Program BFTMED (Liorzou 2001). However, the rapid spatial expansion of the French fishery during the 1990s, in relation to the fishing of the big spawners around the Balearic Islands, made this sampling strategy progressively inadequate. Between 1994 and 1997, the French seafood traders still bought and sold about 50% of the French catches (Liorzou and Bigot 1999), but this percentage strongly decreases after 1998, namely because of the development of the Spanish farms (less than 10% of the French catches went through the local seafood traders in 2000). However, the European logbook was put in force in the Mediterranean in 2000 and, consequently, within the French PS fleet targeting Atlantic BFT in the western Mediterranean Sea (the logbook has thus replaced the French statistical document implemented in 1998). We, therefore, investigated whether this new information can be used to estimate the size composition of catches of the French purse seiners targeting bluefin tuna in the Mediterranean Sea.

2. SIZE COMPOSITION BASED ON EU LOGBOOK DATA

The logbooks of 37 boats (among 38) were recovered in 2001. Besides usual information (boat identification, size, power, dimension of the seine, etc.), the logbooks also recover daily information on the fishing activity, fishing and landing locations, number of positive and negative sets and mean weight per day. Logbooks do not provide sufficient information to compute a reliable CPUE index of the French PS fleet (namely because of a lack of data regarding the effort, for more details see e.g., Fromentin 2002), but could be of interest to get the size frequencies of the catches. The present analysis is based on a total catch of 5226.367 tonnes (a substantial part of the total catch in 2001), for which daily mean weight information is also available. This amount corresponded to 635 positive fishing days done by the whole PS fleet. The procedure to obtain the monthly size compositions of the catches is identical as the one used for the sale records of the local seafood traders: (i) each daily mean weight is converted in a corresponding daily mean fork length (using the ICCAT weight-length relationship for the Mediterranean, ICCAT 1997) and (ii) the number of fish is deduced from each couple daily 'catch-mean weight'.

The comparison of weight and size compositions of the catches did not reveal any doubtful patterns (**Figures 1 and 2**), so that we may conclude that the weight-length conversion did not bias the size composition. In March and April, catches were dominated by fish of 25-30 kg (105-115 cm), with a main class at 25kg (107 cm). In May, small BFT of 8 kg (73 cm) largely dominated the catches, but few catches of large fish around 175 kg and 200cm entered into the fishery (indicating the beginning of the fishing season around the Balearic Islands). June and July are typical of the Balearic season. Catches displayed a bimodal pattern, the first mode around 20 kg (100 cm) and the second around 190 kg (210 cm), with some catches in between. From August to the end of the fishing season, catches were again dominated by juveniles of about 7 to 25 kg (70-110 cm); the classes of 7 kg (70 cm, October), 10 kg and 11 kg (79 cm and 81 cm, August) and 12 kg (84 cm, September) being the largest ones.

3. COMPARISON OF THE 2001 SIZE COMPOSITION WITH PREVIOUS ONES

To check the 2001 size composition, we first compared it with the monthly mean weights of BFT of age 1 to 3 estimated by Fromentin (2002) from the sale records of the seafood traders between 1982 and 1998 (**Figure 3**). From 1982 to 1998, BFT of age 3 were about 15-20 kg (90-100 cm) in March and April, so significantly lower than those in 2001. The peak of small BFT in May 2001 correspond to age 2 fish, but those of 25 to 30 kg (105-115cm) were also significantly larger than those of age 3 deduced from the historical data. Catches of June and July 2001 fit correctly with BFT of age 3 (15-22 kg, 90-105 cm); Note that June 2001 also included some BFT of age 2 (~90 cm and 10 kg). The August 2001 catches were partly in agreement with the 1982-1998 records. This month included juveniles BFT of age 2 (~ 80 cm and 11 kg) and age 3 (~ 100 cm and 20 kg), but also some catches in

between (i.e., BFT about 90 cm and 15 kg) and greater than age 3 (i.e., BFT about 110 cm and 25 kg). September and October 2001 were in conformity with the historical data, with catches typical of BFT of age 1 (~70 cm and ~7 kg), 2 (~85 cm and ~12 kg) and 3 (~100-105 cm and ~22 kg).

The large numbers of BFT of 105-115 cm and 25-30 kg in March and April 2001 (and secondarily in May and August 2001) are likely to be BFT of age 4. This is supported by the histograms of the catches of French PS in March and April along the 1982-1998 period that show that BFT between 25 and 30 kg were frequently caught in the Gulf of Lion during the 1980s and 1990s **(Figure 4)**.

4. DISCUSSION-CONCLUSION

The description of the 2001 size composition computed from the EU log-books did not display any doubtful patterns and appeared, on the whole, in agreement with the 1982-1998 size compositions estimated from the local seafood traders. However, daily mean weight information reported on the logbooks poses two kinds of problems. First, this information is not validated by any standard protocol. In other words, we have to trust the estimation or the measure made by the fishermen, for whom the purpose is not to get accurate size composition, but simple estimates of the mean weight. This can induce some biases due to an overestimation of some classes (such as the 25kg class) or a mixing of different classes (such as BFT between age 2 and age 3 in August). Second and most important, daily mean weight cannot reflect the size composition of the catches when the daily catch included: (i) several shoals or (ii) a single shoal of heterogeneous age-classes. The former limitation is indirectly documented in the logbooks by the number of positive sets corresponding to each daily catch, which was most often between 1 and 4. However, we cannot correct for this bias because mean weight information is only reported by day and not by set. The latter limitation is particularly strong for shoals of spawners that can commonly include fish between 50 kg and 275 kg (i.e., ages 6 to 15), so that information given by the mean weight is useless (this bias is suspected to be less important for shoals of juveniles).

In conclusion, information from the EU logbooks can give a broad picture of the size composition of the French PS catches, but it needs to be validated to fulfil ICCAT requirements. Without such validation, there is an additional risk of mis-assignment in the ageing procedure, which is already one of the main problem of the BFT stock assessment (see e.g. Anonymous 1998, Fromentin 2002). Regarding the spatial and temporal dynamic of the French fishery, only an observer program could correct and validate the size frequencies calculated from EU logbooks. Observers on board would indeed use a standard protocol, estimate the size composition of heterogeneous shoals and distinguish between shoals caught the same day. Furthermore, observers on board could collect some information on live BFT transferred into pools for farming.

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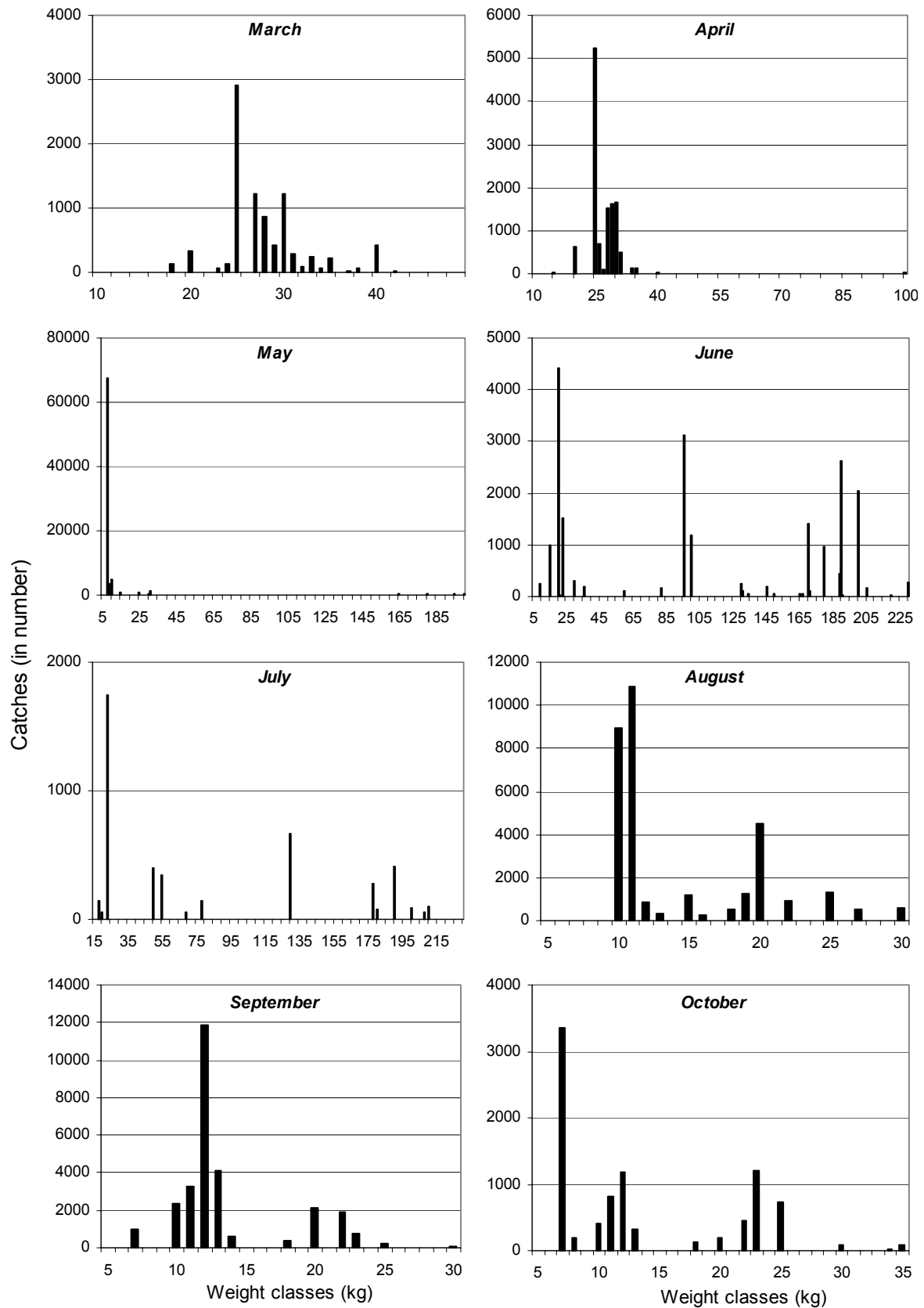
Figure 1. Monthly weight composition of the French purse seiners catches of bluefin tuna in 2001
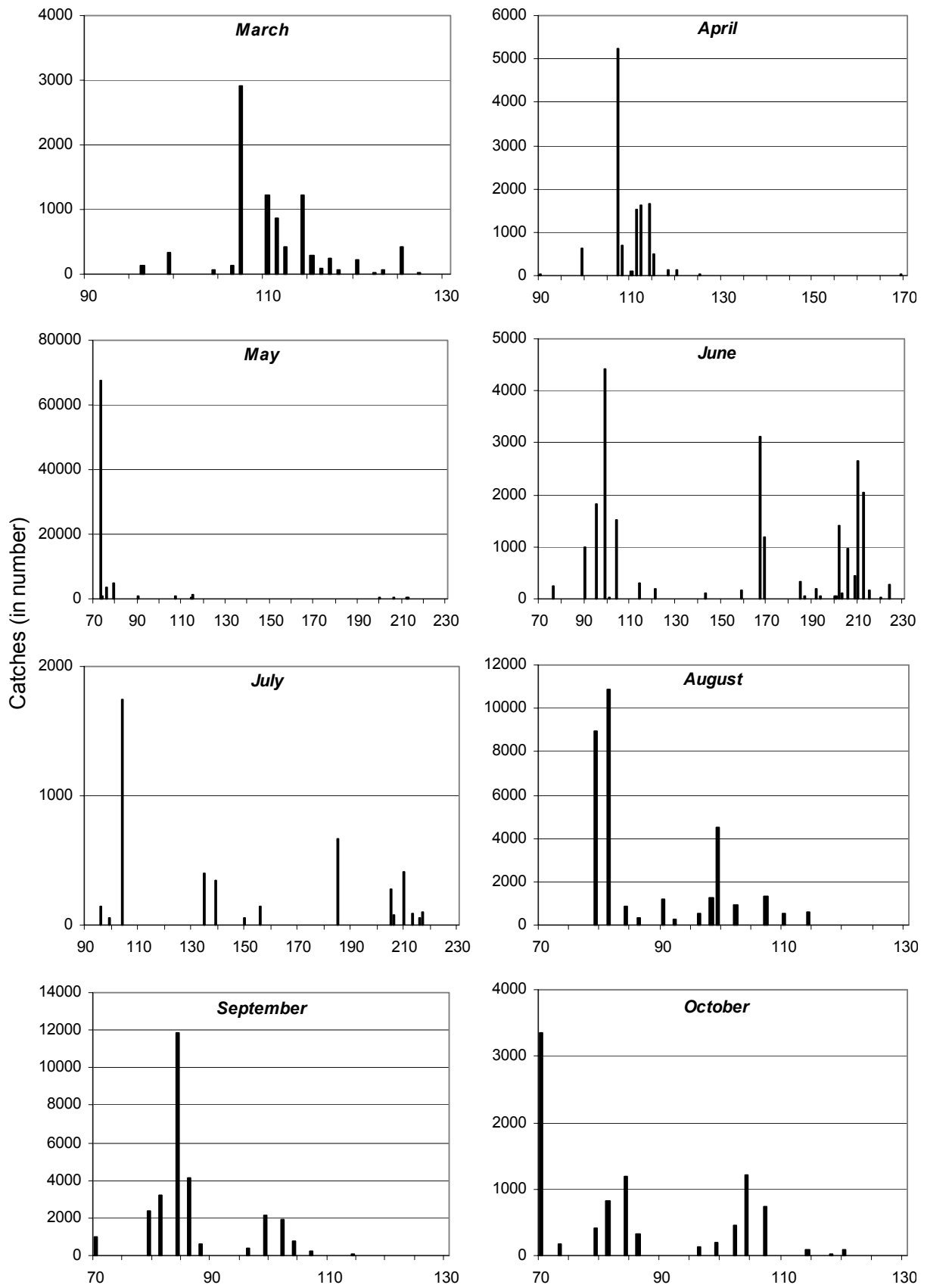
Figure 2. Monthly size composition of the French purse seiners catches of bluefin tuna in 2001
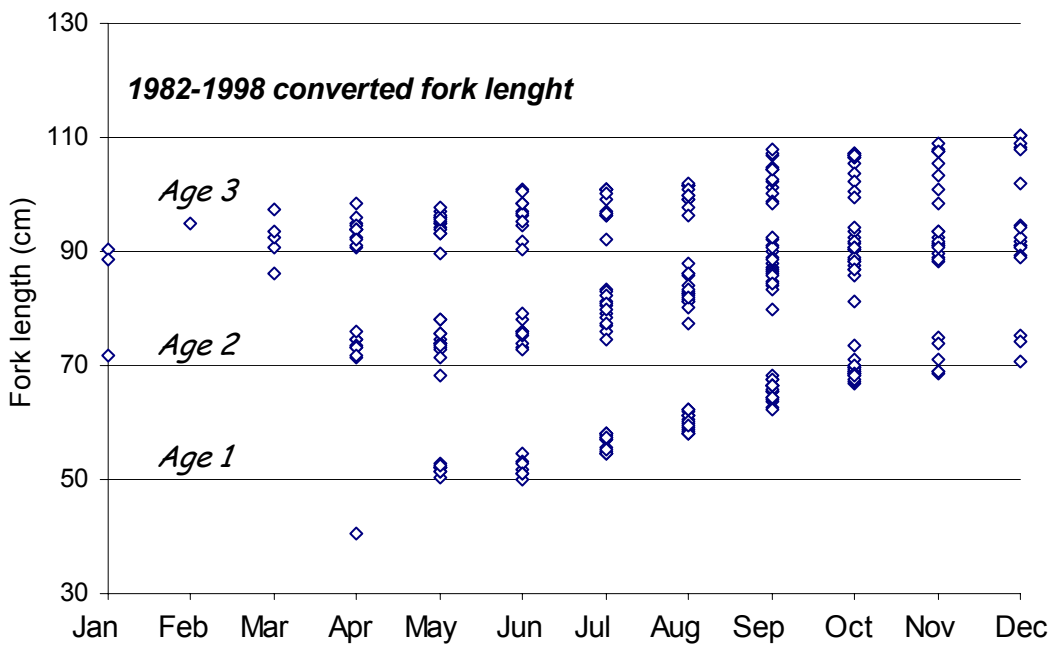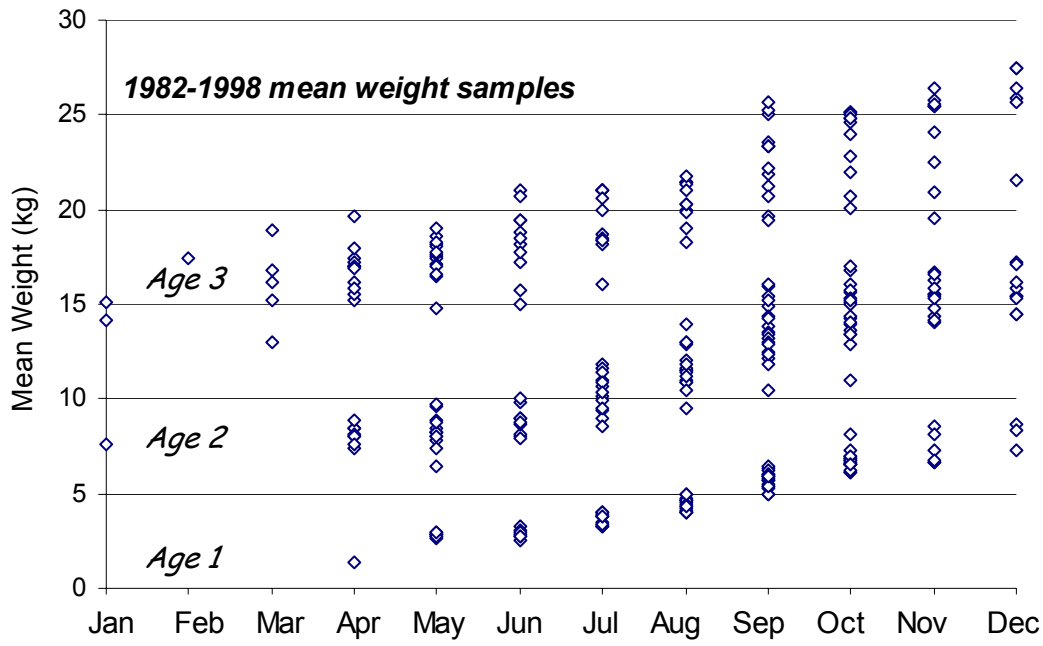
Figure 3. Monthly mean weights of bluefin tuna catches estimated, for fish of age 1 to 3, from the sale records of the seafood traders between 1982 and 1988 (see Fromentin 2002)
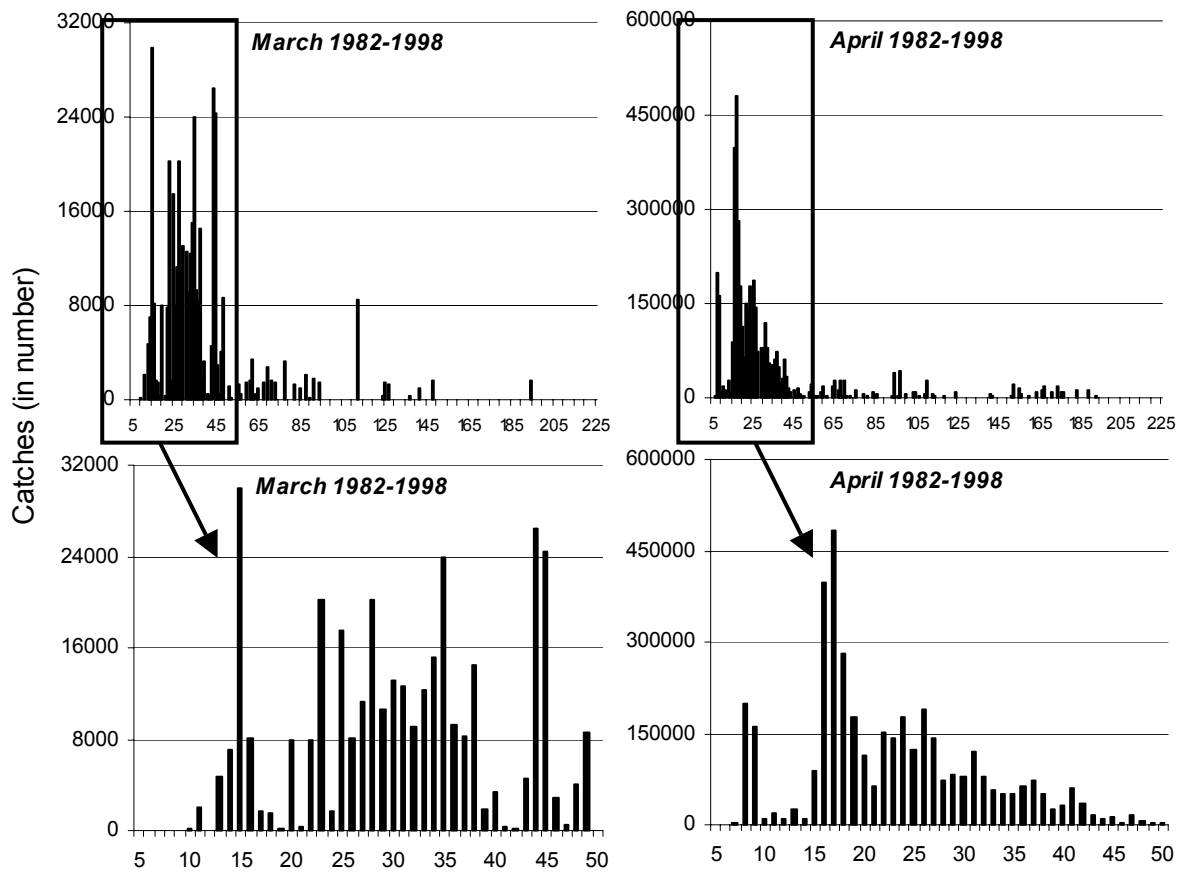
Figure 4. Histograms of the catches of the French purse seiners in March and April along the 1982-1988 period