

SCRS 2006: towards clear and firm ICCAT reports on Atlantic bluefin tuna stocks?

An open letter to the bluefin group and to the SCRS

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Résumé

Cet article part de la considération du fait que les derniers rapports du SCRS sur le thon rouge sont jugés peu explicites quand à l'ampleur des problèmes statistiques, de recherche biologique et d'évaluation. Il apparaît que la population de thon rouge de l'Atlantique est sans doute menacée à court ou moyen termes d'une grave surexploitation, possiblement irréversible, mais que cette menace n'apparaît pas clairement, faute pour le SCRS de pouvoir réaliser de bonnes évaluations de l'état des stocks, suite aux carences des données de base. Cet article recommande au SCRS de rédiger pour le thon rouge un rapport selon un format ad hoc et qui, basé sur l'examen d'indicateurs bien choisis, et plus sur d'impossible évaluations par VPA. Le document SCRS devrait montrer clairement les graves dangers affrontés actuellement par la population de thon rouge. Cet article recommande aussi, faute d'analyses, que l'approche de précaution soit mise en œuvre par le SCRS pour proposer à la Commission ICCAT les fermes mesures de gestion qui sont indispensables à la conservation du thon rouge.

Summary

This paper is based on the fact that the recent SCRS reports on bluefin tuna are not very clear to show the gravity of the ICCAT problems in its statistics, research and assessment for this species. The Atlantic bluefin population is now probably facing in the short or medium terms a high risk of potentially irreversible overfishing. However this severe risk is not clearly visible in the recent SCRS analysis because of the difficulties to run a realistic stock assessment on these stocks when most of the basic data are missing. This paper makes a recommendation that SCRS should write its bluefin report using a non standard specific format using well selected indicators and not its traditional VPA. This SCRS report should also show the serious conservation risks presently faced by bluefin in the Atlantic. This paper also reaches conclusion that a precautionary approach should be developed by SCRS in order to make firm management recommendations that are need to conserve bluefin tuna.

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1-Introduction

Any expert in tuna stock assessment reading the 2004 and 2005 bluefin SCRS reports (an. ICCAT 2005 and 2006), and following the trends in bluefin stocks and fisheries, is increasingly surprised by the lack of a firm and clear scientific message emerging from these recent SCRS reports. In these SCRS reports, bluefin stock status and prospects look more or less like other tunas, only with additional uncertainties in data and analysis. In the recent SCRS reports, there is nothing highly visible upon the extreme bluefin peculiarities and upon the very dark prospects that are probably faced by these stocks if nothing is done by ICCAT. The only way to obtain a more comprehensive information is to explore the various large and complex bluefin WG reports, but this is a very difficult exercise that can only be done by trained scientists and not by commissioners, fishermen, or simply citizens interested in bluefin. Recent SCRS reports are primarily based on Virtual Population Analysis: as nowadays the bluefin data bases are increasingly poor as even total catches are widely unknown, the result is that the recent SCRS reports have lost their substance and any strong scientific message sent to the ICCAT Commission and to the international community interested by the fate of Atlantic bluefin stocks.

On the other side, there is no doubt for every scientists following bluefin stocks² and fisheries that the present conservation prospects are very dark for these bluefin stocks, due to a combination of multiple highly visible factors: the extreme complexity and variability of the bluefin sub-populations, a long living and potentially fragile stock, a very high value on the sashimi market, very poor fishery statistics (probably the worse in the ICCAT data base?), a wide overcapacity of fishing fleets, insufficient researches, and a nearly complete lack of efficient management by ICCAT.

In such a dark context, the 2006 SCRS report on bluefin should be written by bluefin scientists giving very little weight and time to data analysis, but targeting a wider scope and comprehensive overview of the present context of bluefin stocks and fisheries, primarily based on simple basic indicators. Such a global discussion of the bluefin prospects should necessarily include a clear discussion on the following points:

(1) on the critical lack of statistical data, a problem worsened by quotas and by bluefin farms.

(2) on the extreme complexity and variability of bluefin stock structure and biology,

(3) on the structural fragility of bluefin stocks and sub populations, and on the urgent need to develop more active large scale researches on bluefin,

(4) on the massive overcapacity of bluefin fishing fleets, a problem that has been worsened by bluefin farms,

(5) on the urgent need to promote firm and well applied precautionary management measures, as none of the present or incoming stock assessment will be able to establish scientific recommendations based on a comprehensive stock assessment analysis.

Most of these basic points and subsequent recommendations are poorly visible in the recent SCRS reports. This comprehensive overview is necessary, simply because the SCRS report should provide all the truth on bluefin stock to the ICCAT commissioners, fishermen and citizens interested by bluefin tunas,. This is not the case today!

The present note will briefly review and discuss these points.

² Stock and population : see the annex 1 for the definition of stock, population and sub population used in this document.

2) Lack of statistical data:

Bluefin fishery statistics are by far the worst among all the Atlantic tunas because of its severe and worsening deficiency of both TASK1 and TASK 2 statistics. These problems have been recently worsened by the ICCAT quotas and by the farming process. Recent creations of bluefin farming in various countries have widely deteriorated bluefin statistics, while very little efforts have been developed by fishing countries, EU and others (the exception being the detailed results collected in some farms by Italian scientists, Di Natale 2005), to solve these new serious statistical problems, although there is no doubt that detailed biological and statistical data could quite easily be obtained from these farms, simply because all the tunas in these farms are permanently monitored by their owners, the farmers.

As a result, while some countries are doing major investments and effort to collect, to process and to provide to the ICCAT good and detailed statistics, a majority of the fishing countries do not provide any of the basic legal statistical data requested by ICCAT, task1 and task2. This problem is now mainly political: it has already been fully identified by SCRS but unfortunately the SCRS recommendations on these problems had very few positive results.

Such lack of statistics is **against the EU and ICCAT statistical regulations, and all fishing countries members or entities cooperating with ICCAT should provide, in due time, all their detailed and unbiased TASK1 and TASK2 data, including when fishes are transferred to farms.**

Knowing that these fishery statistics are necessarily the structural basis of all bluefin stock assessments, there is no hope in such context to do any comprehensive stock assessment on the recent trends of bluefin stock, during the SCRS 2006 or later years. Furthermore there is no hope to estimate the risks of stock collapse, keeping in mind that this risk is now possibly very high (see paragraph 6).


The only way for the SCRS to work on bluefin stocks will be to select good **indicators** (for instance CPUEs of the selected fleets that are providing data, preferably by size categories), and to use them to follow the trends in the various components of the stocks. These indicators will be like measuring the temperature of a sick person: they can help to evaluate the severity of the disease, but they cannot provide a comprehensive diagnosis of the illness.

As a conclusion, there is a strong need to take immediate and firm actions to collect task1 and task2 statistics for all bluefin fleets, and the gravity and urgency of these problems should be strongly stated in the SCRS report. **The names of all fisheries and countries that are not at all fulfilling their ICCAT statistical obligations should be clearly visible in the SCRS reports.**

3) Extreme complexity and variability of bluefin stock structure and biology

One difficulty in the bluefin stock is the incredible complexity and variability of this population.

Among the major scientific pending questions on bluefin we can list:

 The incredible complexity and variability of its spawning and feeding zones; multiple fishing zones, possibly variable over time, in the Med and in the Atlantic (East and West).

- Multiple spawning zones and the fact that spawning fidelity to the birth strata remains hypothetical (but probably a realistic hypothesis, Cury 1994). Such homing behaviour targeting a given spawning strata could easily be a source of irreversible genetic erosion (a risk that should be explained and discussed by the bluefin SCRS report)
- As a result bluefin movement patterns are better understood, (Block et al 2005, Carlson et al 2004, De Metrio et al. 2005, Wilson et al. 2005), but they are still very far from being understood in their full complexity and variability. These movements are far from being modelled by any computer program!
- The potential parental effect, very large female playing a major role in the reproduction of the stock because of their much more efficient egg and larvae production (Birkeland and Dayton. 2005), remains widely hypothetical (but probably a realistic hypothesis for bluefin?)
- Very strange historical changes in the bluefin distribution North-East and N-W Atlantic: the Brazilian fisheries in the early sixties, the Nordic fisheries between 1930 and 1970, the sub Arctic recent fishing zones, etc... remain poorly understood.
- Its spectacular and variable N-S and E-W migration patterns: the two stocks West & East of 45°W are for instance highly questionable, as bluefin are doing extensive but variable migrations in the entire North Atlantic and Mediterranean Sea across this biologically artificial ICCAT management frontier.
- Surprisingly there is also often a lack of significant movements (viscosity) observed for bluefin in some area (off Corsica, Turkey, Lybia, Morocco)
- Its spectacular long term « cycles » of natural variability, well shown by the analysis of centuries of historical trap data.
- Its apparent differences in ages at first spawning in the Eastern and Western Atlantic Ocean.

These major uncertainties represents major limiting factors to do scientific analysis and realistic modelling of bluefin stocks.

There is still nowadays a global severe **weakness of scientific investigations on bluefin by most ICCAT countries**: most biological researches recommended for bluefin by SCRS are still waiting to be funded when, on the other hand, large amount of fundings have been invested to subsidize bluefin fleets and farms. As a result, after more than a century of scientific investigation, major biological uncertainties are still pending for bluefin.

The SCRS report should firmly conclude that there is now an urgent need for a major and well coordinated biological research program on Atlantic bluefin. Such multiannual research would be expensive (but still at a minor cost compared to the “value” of the bluefin stocks), and it should cover all the components of the Atlantic bluefin population. It should be urgently developed and managed or coordinated by the ICCAT.

4) Structural fragility of bluefin stocks and sub populations: an urgent need for an ICCAT large scale bluefin programme

There is no doubt that the bluefin stocks are among the more fragile tunas stocks because of their main biological characteristics: great longevity, slow growth, late spawning, low natural mortality, large biomass, but low biological productivity (Fromentin and Fonteneau 2001).

These stocks are protected by their very wide geographical distribution, but their peculiar spawning behaviour put them in serious potential dangers: during their mass migration at a given season targeting “spawning hot spots”, they are highly vulnerable to a wide range of fisheries, especially in the Mediterranean Sea (major spawning zones in very small strata that are well known by fishermen). Mediterranean Sea is clearly the “key stone area” for survival or death of the bluefin stock, simply because of the large bluefin catches potentially taken by modern fleets in relation with these small spawning strata. It is easy to imagine that the present large fleet of highly mobile vessels can potentially fish 100% of the bluefin biomass in these small spawning strata.

Furthermore, it seems that significant fractions of bluefin stocks are resident in given areas without doing the large migrations that are typical for a bluefin tuna (then various fractions of stocks being probably highly “viscous”, Maccall 1990) (De Metrio et al. 2005). In this context it would seem that the recent major increase of bluefin catches was mainly obtained through a geographical expansion of fishing zones within the Mediterranean sea (unfortunately the nearly complete lack of task 2 statistics does not allow to evaluate these changes in fished areas in the Med).

In such process, it would appear that the entire Med. Sea, could easily be entirely fished out in a near future, and without refuge for bluefin. Under this hypothesis, the bluefin fishery would have been working during recent years in a **mining style**, simply overfishing one after the other all the geographical fractions of the various Mediterranean sub-populations. This hypothesis should at least be discussed by the SCRS report, based on the few task2 data available, and using other qualitative information available to ICCAT scientists.

5) The overcapacity of bluefin fishing fleets

There is no doubt that Mediterranean bluefin tuna is highly vulnerability to present fisheries:

- ✓ **Multiple fisheries** are targeting bluefin: longliners, purse seiners, handline, troll, traps, drifting nets, recreational and sport, etc. Many of these fleets are unrecorded by ICCAT: IUU fleets, driftnets, sport and recreational fisheries.
- ✓ Due to the **small size of the Mediterranean Sea**: an area of only 3 million naut. Sq. miles (vs 68 million for Atlantic tunas)
- ✓ Today, there is clearly a **wide overcapacity** of bluefin fishing fleets: large increases of fishing efforts have been observed during recent years, especially in the Mediterranean Sea, with a total number of purse seiners reaching 200 vessels (when only 40 purse seiners are exploiting the 3 species of tropical tunas in the eastern tropical Atlantic). Most of these fleets are highly modern. The trend to increase fishing efforts targeting bluefin was observed for many gears.
- ✓ Due to the **bluefin behaviour**: bluefin tuna schools are easily seen from planes and easily caught by various gears, in their coastal feeding migrations as well as during their spawning stanzas.

✓ Recent development of **tuna farms** have increased the value of bluefin catches and they have accelerated the increases of fishing efforts and fleet modernization. In such a context, it would appear that the present bluefin fleets and their associated planes can easily catch 2 or 3 times the yearly quotas recommended by ICCAT.

6) An impossible bluefin stock assessment

Since 2002, there has been a lack of consistent stock assessment by the ICCAT/SCRS, due to the lack of basic catch and effort and size data, and due to the great structural complexity of the bluefin assessment.

bluefin is facing a typical problem that in the absence of sufficient fishery data, for instance when even total catches are widely unknown and in the absence of scientific (fishery independent) data, it is strictly impossible to carry out a comprehensive stock assessment. The reason for such a deficiency is simple: in fishery stock assessment, catch and effort data are the basic information driving all the analysis, as catches are the major cause of stock declines, and cpue providing a potential measure of its decline.

There is no hope to see any trustworthy assessment by the ICCAT, this year (2006) or soon, as these bluefin problems are structural, with a black hole in the data base covering long periods. In such context, the only realistic tool available to the SCRS would be an efficient use of well selected **fishery indicators**: at least they could help to evaluate the trends in the stocks.

However it should be kept in mind that many of these basic indicators are often misleading. For instance, purse seiners can maintain good catches and good CPUEs with declining biomass, because of their increasingly powerful fishing technology, of their geographical flexibility and of their fishing method. This type of modern purse seine fishery can obtain misleading good CPUE and high bluefin catches, even at very low stock biomass (as for the Canadian cod in the late eighties, before the collapse). However these CPUE indicators of purse seiners are still very useful to analyse in order to evaluate changes in fishing patterns and of fishing strata.

Coastal fisheries, such as traps and sport fisheries, may often be less flexible but more representative of the real trends in stock abundance. The very low catches of the French and Spanish sport fisheries in the 2005 bluefin tournaments, or the recent very low catches by Spanish traps, may be more representative of the stock decline.

The choice of such best indicators and of the conclusions based on their analysis should be an important part of the incoming SCRS report, without losing too much scientific time and energy in the lost fight of trying to do a modern stock assessment.

7) Towards firm precautionary management measures recommended by SCRS

In the present context, there is a high probability that if nothing is done by ICCAT in the short term, the Atlantic Bluefin tuna stocks and fisheries will soon face an inevitable **disaster**, even if the date of this disaster is still unknown because of the nearly complete lack of basic data. The Atlantic bluefin stock is now in the same situation as Southern bluefin stock 20 years ago (see the annex).

In such circumstance the ICCAT scientists should keep in mind the **the example of southern bluefin tuna and its overfishing**: Southern bluefin tuna stock is typically a sad example of severe overfishing of another bluefin that should be kept in mind and avoided. The brief history of this stock and of its present overfishing can be summarized as following:

- 🐟 1956-1975: 20 years of very large catches by longliners, and a stock already overfished in 1975
- 🐟 1976-1985: 10 years of too high fishing mortality by longliners with large additional juvenile catches taken by purse seiners
- 🐟 **15 years of very low quota without any stock recovery:** recruitment levels and adult stock are still maintained at very low levels, typically a severe case of recruitment overfishing, the only example presently observed for any tuna stock.
- 🐟 The long term prospects for the stock still remain widely questionable
- 🐟 This lack of recovery may be due (1) to genetic erosion, (2) to an ecological Allee effect, (3) to a loss of migration potential, at a too small stock size

The *ex post* analysis of this dramatic overfishing indicates that if a strict control of the fishing activities would have been developed during the early seventies, the spawning stock and its recruitment would probably be at good levels today.

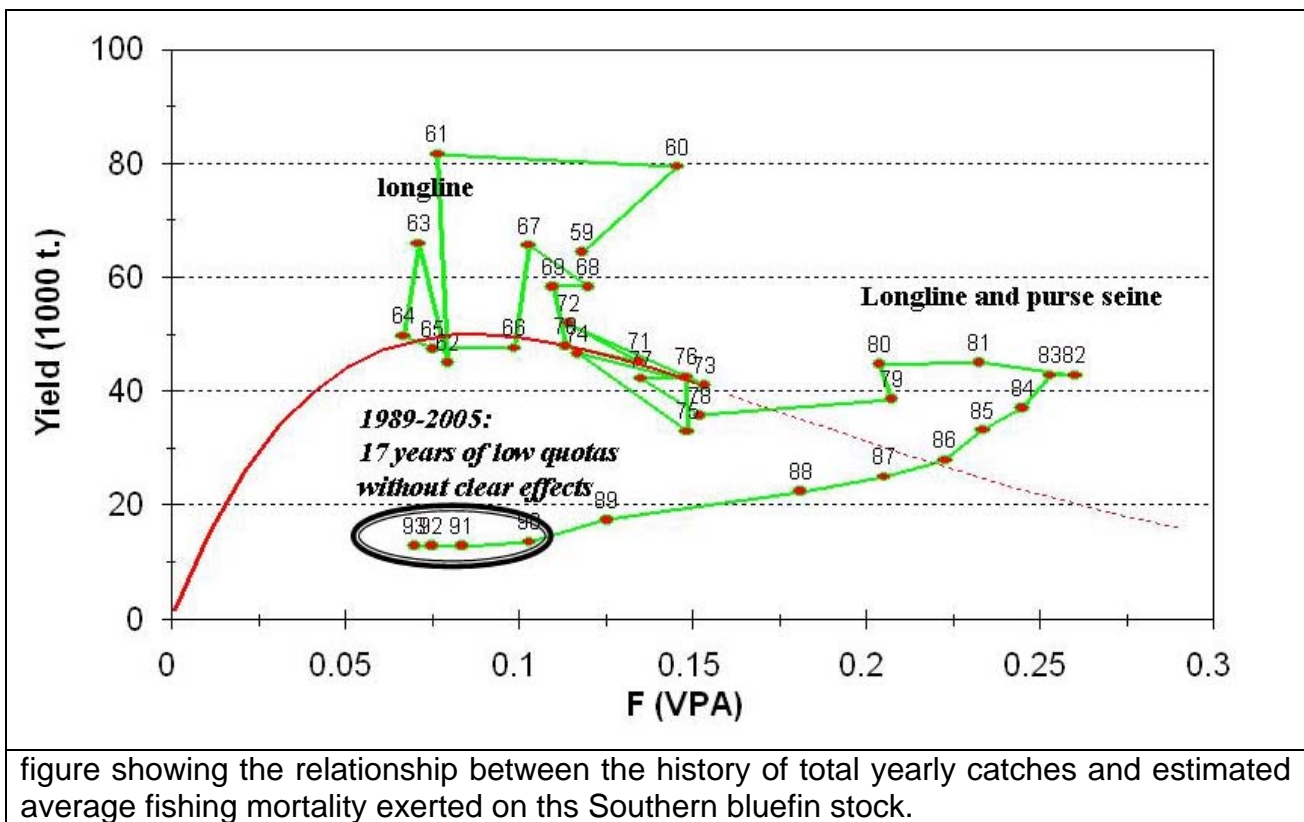


figure showing the relationship between the history of total yearly catches and estimated average fishing mortality exerted on the Southern bluefin stock.

It would appear that the Atlantic stocks are possibly in a situation to southern bluefin in the early eighties. This is typically and perfectly the case where very firm management « precautionary recommendations » should then be already proposed by SCRS in its report, and without waiting for the results of an impossible goal of obtaining comprehensive stock assessments.

Such drastic management actions should necessarily lead to **major reductions in the bluefin fishing capacity and catches**, even if these reductions will be very difficult to manage in terms of their large human and economic costs: they are simply the consequence of promoting in many countries multiple, uncontrolled and excessive fishing and farming capacities on bluefin stocks during more than 20 years.

8) Conclusion

The recommendation of this paper is that the 2006 SCRS report on bluefin stocks should be written by the SCRS quite independently of the traditional SCRS format and abandoning the artificial and dangerous stratification of two Eastern & Western Atlantic stocks, but following guidelines similar to the points previously discussed in this paper.

Such a report should be short, but very clear in its explanation of the present bluefin problems and dark prospects. It should also be very firm and clear in its recommendations dealing with statistics, research and management. At least, even if nothing is done by the ICCAT Commission to solve these problems, these critical points should be highly visible and clearly written each year in all the SCRS reports; this is not the case today.

This report should also clearly explain why the bluefin stocks and fisheries are trapped in a lethal scenario: if nothing is done, there is a high risk that this stock will collapse soon and with a risk of irreversible extinction, probably within the next 10 years.

Such a collapse of the stock is quite easy to predict, based on a combination of clearly visible additive negative factors such as:

- 🐟 The **biological fragility** of bluefin: a long living species with large biomass but low productivity, its potential for genetic erosion (because of its multiple spawning strata)
- 🐟 The major **statistical** deficiencies (a majority of bluefin catches submitted with highly biased task1 and without any task 2 data), when these basic fishery data are the basic input available for stock assessment.
- 🐟 Subsequently, a **lack of recent stock assessment**: there is no hope to do in 2006 (or later) a comprehensive analysis, when even the recent trend and levels of total catches are widely uncertain. The work of SCRS should be now *de facto* limited to a follow up of a few selected indicators (cpue and sizes of fleets providing data).
- 🐟 The **weakness of biological studies** on Atlantic bluefin, when this species is probably the more complex tuna resource; this lack of biological knowledge severely hampers all the present assessments by the ICCAT.
- 🐟 The **great overcapacity of fishing fleets** targeting bluefin; the 200 purse seiners and their associated planes, as well as large numbers of other gears, most of these fleet being very modern & efficient; they are the worse danger faced at present by the bluefin stock.
- 🐟 The **negative effects of bluefin farms**: they have widely increased the value of bluefin catches, increased the pressure on the stock, and also produced a severe worsening of many fishery statistics
- 🐟 The **lack of efficiency of most management measures** taken by ICCAT on bluefin, the worse example of this nearly complete failure being the uncontrolled catch quotas in the Eastern Atlantic and Mediterranean Sea

In such a very dark context, there is no doubt that the SCRS report should carry the clear and strong message that if ICCAT does not take rapid and strong actions for this species, the Atlantic bluefin tunas will soon be facing a critical danger of a possibly irreversible collapse. The SCRS message should now be: it is urgent now to try to save bluefin tuna population, promoting a review of **stock status based solely on well selected indicators**, and on **an active precautionary management of the bluefin stocks**. And these important points of the SCRS should be highly visible in each of the yearly SCRS reports!

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An. ICCAT 2004, SCRS report

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Annex 1

Stock, population and sub-population

These terms have already been defined in the ICCAT glossary, but these multispecies definitions may need to be more explicit in the case of the highly complex bluefin population. All the SCRS reports should be based on a consistent definition that is clear for all its reader, scientists and non scientists alike.

The definitions used in this paper were the following:

- ✓ **Population:** all individuals from a given species living in a given area. *All individuals of *Thunnus thynnus* living in the Atlantic ocean and its adjacent seas (Mediterranean Sea, Black Sea) belong to the same population.*
- ✓ **Sub populations:** fractions of population that are sharing a common and peculiar genetic structure and peculiar biological, movement and behavioural patterns; each of these sub populations has its origin in a peculiar time and area strata, and a majority or all fishes from this group may tend to show a homing behaviour, spawning in its birth area. *This concept of biological sub-populations is widely relevant for Atlantic bluefin, as the Atlantic bluefin population shows a significant genetic heterogeneity probably linked with the existence of various spawning strata. These potential bluefin sub-populations are already well identified (Sicily, Balears, Turkey, Gulf of Mexico), when others remain hypothetical (Sargasso sea, Canary Islands). In such case of multiple sub populations, there is a biological risk that the overfishing may lead to a genetic erosion of this heterogeneous population, through the elimination of some of these biological components.*
- ✓ **Stock:** a stock is a management unit chosen by fishery scientists to assess stock status and to make recommendation allowing to manage this stock. The ideal case is when the limits between stocks corresponds with well identified sub-populations, or at least with low mixing rates between these neighbouring stocks. Such limits between stocks should be seen as being only temporary frontiers used as working hypothesis. They should be modified in order to take into account new scientific information on fish genetics or movements. *The 45 degrees West frontier chosen by ICCAT has been established in the early eighties. It appears nowadays that the East West movement of adult bluefin are significant in this area and that significant fractions of the Western stocks belong to Mediterranean sub populations.*