# NOTE UPON THE SAMPLING PROBLEMS OF THE PURSE SEINE FISHERY DURING THE YEAR 1998

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**SUMMARY**

*This paper makes a comparison of size data taken independently on the EU purse seiners by the field technicians based in Antsiranana (Madagascar) and in Victoria (Seychelles) during the period 1992-2002. The size data taken in the Mozambique Channel during the 2nd quarter were used to do this comparison. This comparison shows that sizes of bigeye and yellowfin taken independently in both ports were very similar or identical until June 1998 and since 2001. The conclusion is the Victoria sampling became biased only after June 1998.*

**RÉSUMÉ**

*Cette note fait une comparaison des tailles des thons qui ont été échantillonnées de manière indépendante à Antsiranana (Madagascar) et à Victoria (Seychelles) durant la période 1992-2002. Les données des tailles des captures provenant du Canal de Mozambique au deuxième trimestre servent de base à cette comparaison. Cette étude montre que les tailles échantillonnées dans les deux ports étaient très voisines ou identiques jusqu'en Juin 1998 et à partir de 2001. La conclusion de cette étude est que les biais dans l'échantillonnage réalisé à Victoria ne sont apparus qu'après Juin 1998.*

## 1 - INTRODUCTION

A previous document made an analysis of the tuna sizes sampled during recent years in Victoria, Seychelles (Fonteneau and al. 2000). This work concluded that there were major problems in the size and species composition sampling conducted in Victoria during the period 1998-2000. All the species composition and size data from the purse seine fishery were subsequently processed based on strata substitutions with other port or other years, in the hypothesis that none of the 1998-2000 size and species composition data could be used. Furthermore, in the 2000 document by Fonteneau and al., there were still some doubts concerning the exact period (year and month) during which the sampling scheme became critically biased. The goal of this study is to do a detailed comparison during the period 1991-2002 of the tuna sizes that have been sampled **completely independently** and simultaneously in Madagascar (Antsiranana) and in Victoria (Seychelles) upon tuna taken in the same time and area-strata. The Mozambique Channel stratum (figure 12) during the second quarter has been selected to make this comparison, because tunas taken in this stratum tend to be well sampled during each year in these two ports. The second goal of this analysis is to conduct during the period during which the sampling problems were observed, a more extensive analysis carried out on all these "redundant sampling" (at the level of quarter-area strata). The final goal of this paper is to select the period during which the results of the Victoria sampling could be used safely, eliminating from the data processing a minimum of data.

## 2 - COMPARISON OF SIZE SAMPLES IN ANTSIRANANA AND VICTORIA 1991-2002

This comparison was done on the sizes of small bigeye and yellowfin tuna taken each year in the Mozambique Channel area during the 2nd quarters during the period 1992 (beginning of the size sampling in Antsiranana) and 2002. This comparison was done on the yellowfin and bigeye samples of small fishes (less than 90cm) that have both been measured in fork length. The results obtained by this comparison are given by figure 1 to 11.

The following observations can be made upon these size distributions:

- in 1992, yellowfin and bigeye modal sizes are very similar with a peak at 58-60 cm. Two differences can be noted between Antsiranana and Victoria samples: (1) yellowfin and bigeye modes are 2 cm smaller for both species in Antsiranana and (2) there is a mode of smaller fishes at 48cm for yellowfin in the Victoria sampling that is not apparent in the other sampling. These differences can be explained easily by the unequal rates of sampling in the 2 ports and by the time heterogeneity of sizes taken (for instance due to growth: Victoria sampling was better at the end of the quarter)
- in 1993: the shapes of size histogrammes are very similar for yellowfin and bigeye sampled in the two

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ports, but there is a strange shift of about 6cm between the 2 sets of size distributions. Such difference is hard to explain (bias in the measuring equipment).

- In 1994, sizes of yellowfin and bigeye are quite different, and there is a perfect correspondence between samples taken in the 2 ports. This is the ideal case.
- In 1995: idem, very good.
- In 1996: sizes of yellowfin and bigeye are quite different, and there is a good correspondence between samples taken in the 2 ports.
- In 1997: sizes of yellowfin and bigeye are quite different, and there is a very good correspondence between samples taken in the 2 ports.
- In 1998: sizes of yellowfin and bigeye are quite different, and there is a good correspondence between samples taken in the 2 ports. This is a quite unexpected results, because there was serious doubts upon the Victoria sampling done in 1998. This figure would indicate that at least at the end of the 1st quarter, size sampling was correctly done in both ports.
- In 1999: there is no relationship between sizes taken in the 2 ports; furthermore w can note a very strange size distribution sampled in Victoria (never seen before) and a perfect correlation between the strange histogrammes for yellowfin and bigeye. This is a confirmation that the Victoria sampling was not functioning correctly.
- In 2000: idem, very bad.
- In 2001: return to the good situation of years before 1999, with a very good correspondence between samples taken in the 2 ports for both yellowfin and bigeye.
- In 2002: idem, very good.

As a conclusion it appears that the sampling scheme may have faced some problems of unknown origin and of moderate gravity at the beginning of the series (1992 and 1993), but the serious problems are observed and confirmed only in Victoria during the period 1999-2000. The conclusion is that the sampling problems were developed in Victoria mainly during the second half of 1998. Thus, it is interesting to try to compare the double sampling done in Victoria and in other ports during the second half of 1998.

## 3 - COMPARATIVE ANALYSIS OF SAMPLING DONE IN ANTSIRANANA AND VICTORIA IN 1998

The numbers of samples done in each port during 1998 show that unfortunately very few landings were observed and sampled in Antsiranana between June and December 1998: only 3 samples were taken in Antsiranana during the last 7 months of the year 1998 and they were taken the same fishing day (in October) on the same boat. Due to this very low availability of alternate sampling, it becomes impossible to evaluate when the sampling done in Victoria started to be erratic. Size sampling was apparently correct during the second quarter in both landing site, and it became biased in Victoria during the second half of the year 1998 at an unknown date.

## 4 - CONCLUSION

This comparative analysis of sizes sampled in Madagascar and Seychelles indicates that, at least apparently, the size sampling done in Victoria harbor before 1998 and during the first half of 1998 was correctly done: the great similarities of these size histograms taken independently by field technicians in Victoria and Antsiranana is a convincing proof as a support of this conclusion. The poor sampling that has been well demonstrated during the years 1999 and 2000 was probably developed during the 2nd half of 1998. As a conclusion, the size data taken in Victoria during the 1st semester of 1998 could probably be used for stock assessment, as well as the size sampling taken in 1997. Presently, none of these 1998 size data were used, as all size and species composition data presently used for 1998 were based on strata substitution with data from Madagascar and from historical data, and there were some doubts upon the 1997 sampling. This conclusion should help to redo a processing of the size data during recent years, allowing to significantly reducing the numbers of strata substitutions done in the processing of size data. Further investigations should be undertaken to better understand the reasons explaining the smaller but unexpected anomalies observed in 1992 and 1993. If some sampling data are shown to be biased, they should be eliminated from the data processing. A last point to note is that such detailed comparison of the "double samples" done independently in the various sampling spots should be done by scientists routinely at the beginning of the data processing, and each year, before any use of the processed data. It is an abnormal situation to identify these historical sampling problems so many years later. These validations should of course be done by the national scientists, before the summation of samples taken in various landing ports within each time and area strata. This real time validation should allow to eliminate the dubious data and to immediately correct the sampling process.

## 5 - BIBLIOGRAPHY

FONTENEAU A., R. M. BARGAIN, V. NORDSTROM, R. PIANET AND P. PALLARES. 2001: Recent estimates of the species composition and size sampling of EU purse seiners: problems in the estimated species and size composition and proposal for revised 1998 and 1999 catches and size statistics. Document IOTC WPTT/00/15, pp 354-363

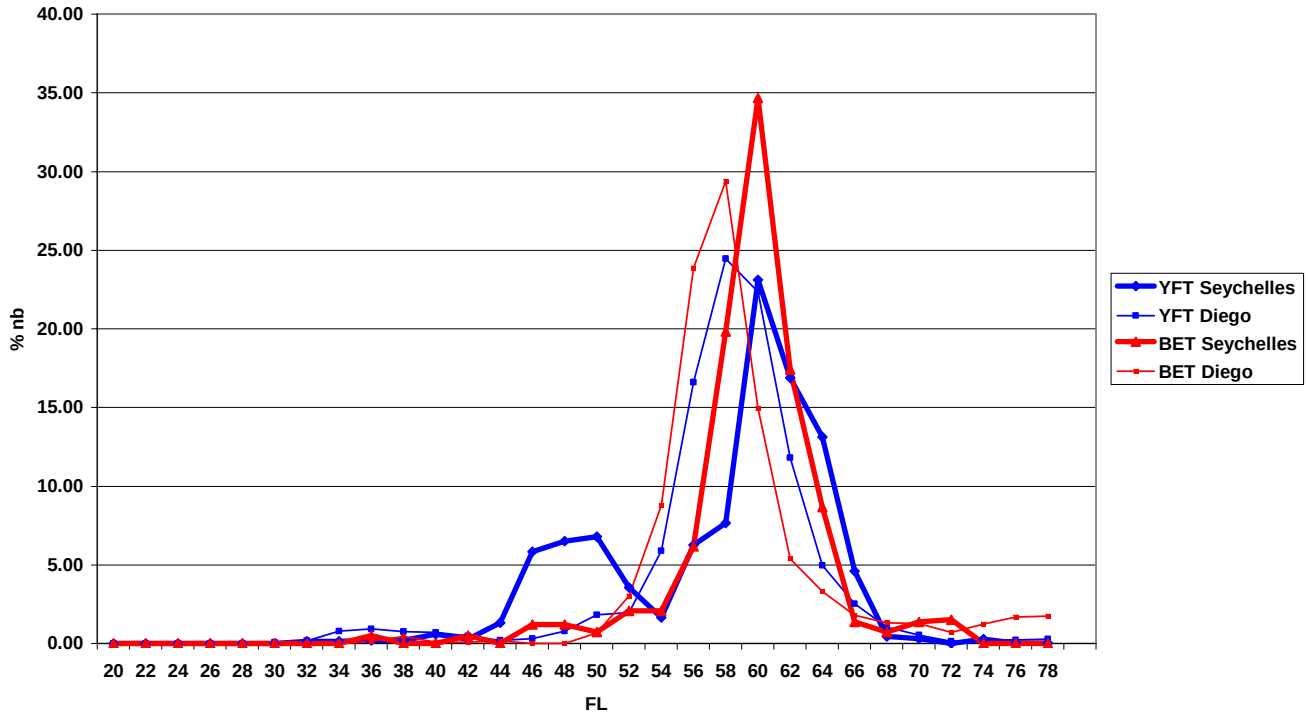


*Figure 1: Size distribution (in %) of the small yellowfin and small bigeye taken in the Mozambique area during the 2nd quarter of 1992 and measured in Victoria (Seychelles) and in Antsiranana (Madagascar).*

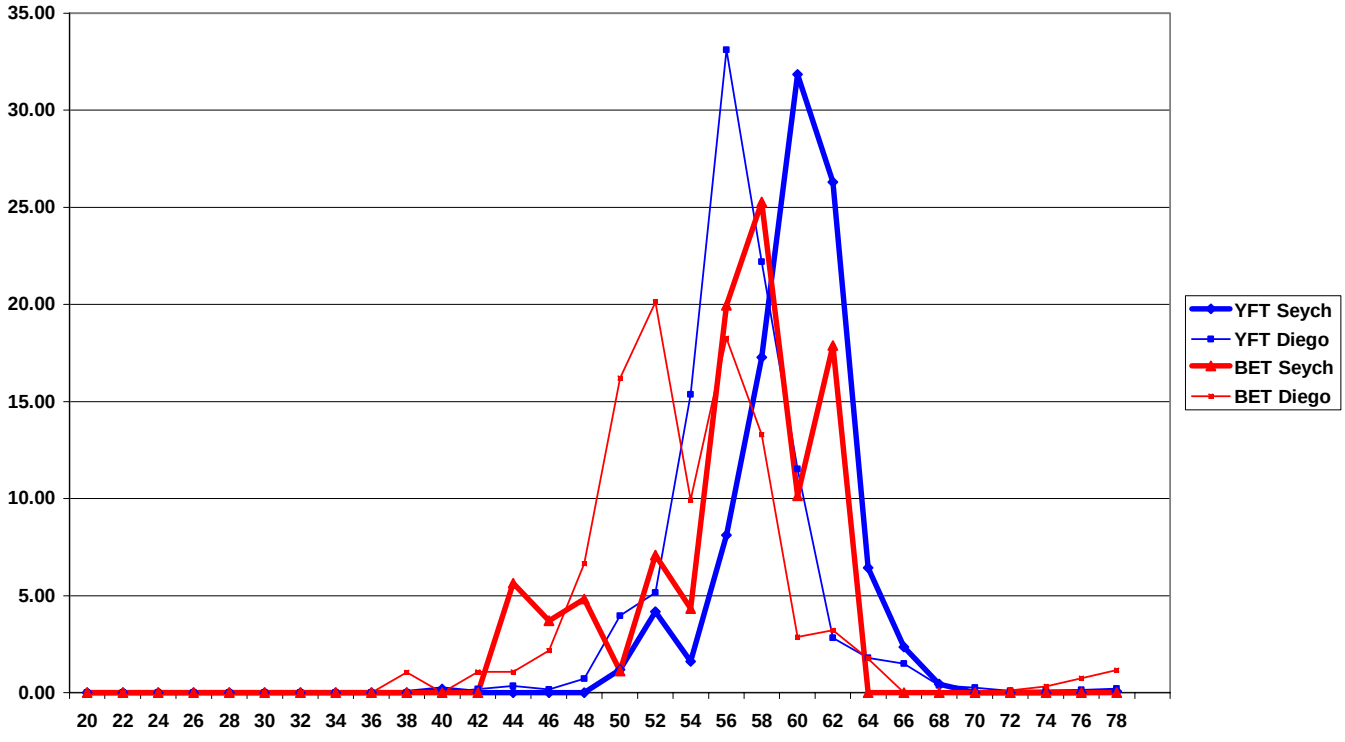


*Figure 2: Size distribution (in %) of the small yellowfin and small bigeye taken in the Mozambique area during the 2nd quarter of 1993 and measured in Victoria (Seychelles) and in Antsiranana (Madagascar)*

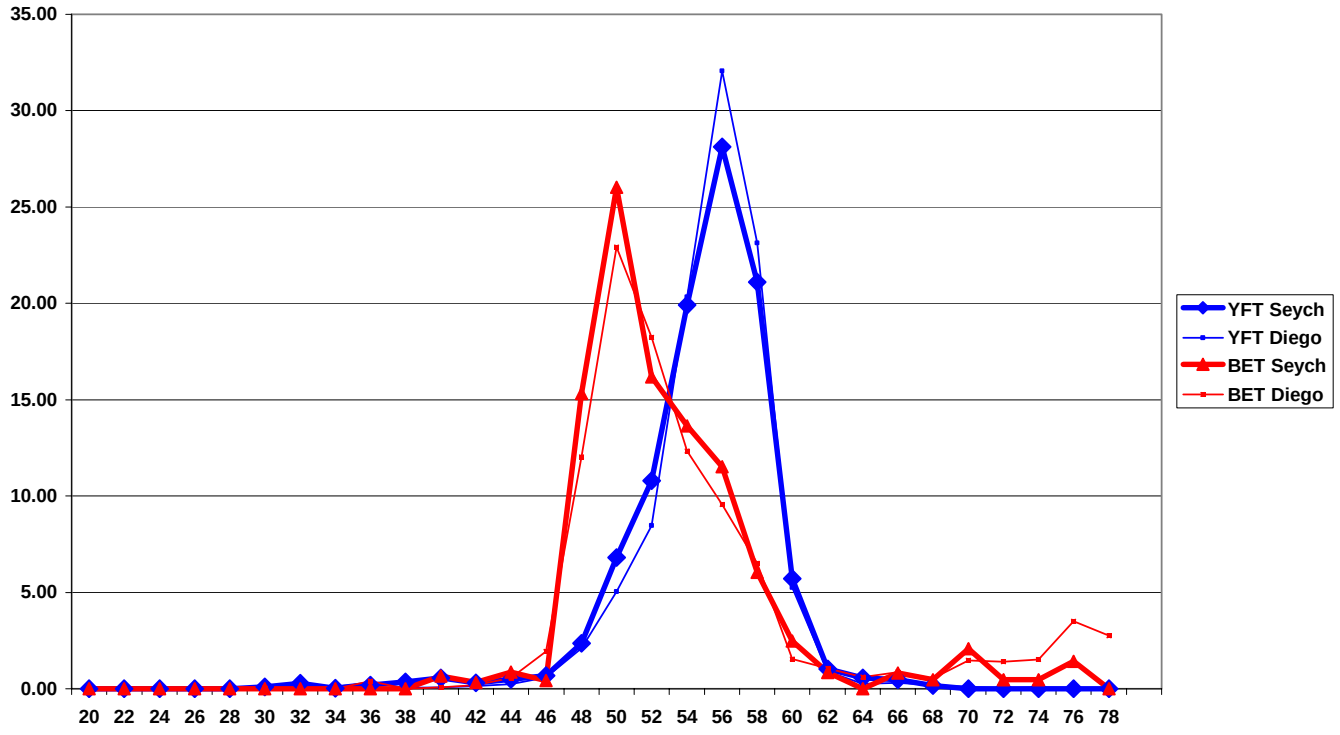


*Figure 3: Size distribution (in %) of the small yellowfin and small bigeye taken in the Mozambique area during the 2nd quarter of 1994 and measured in Victoria (Seychelles) and in Antsiranana (Madagascar)*

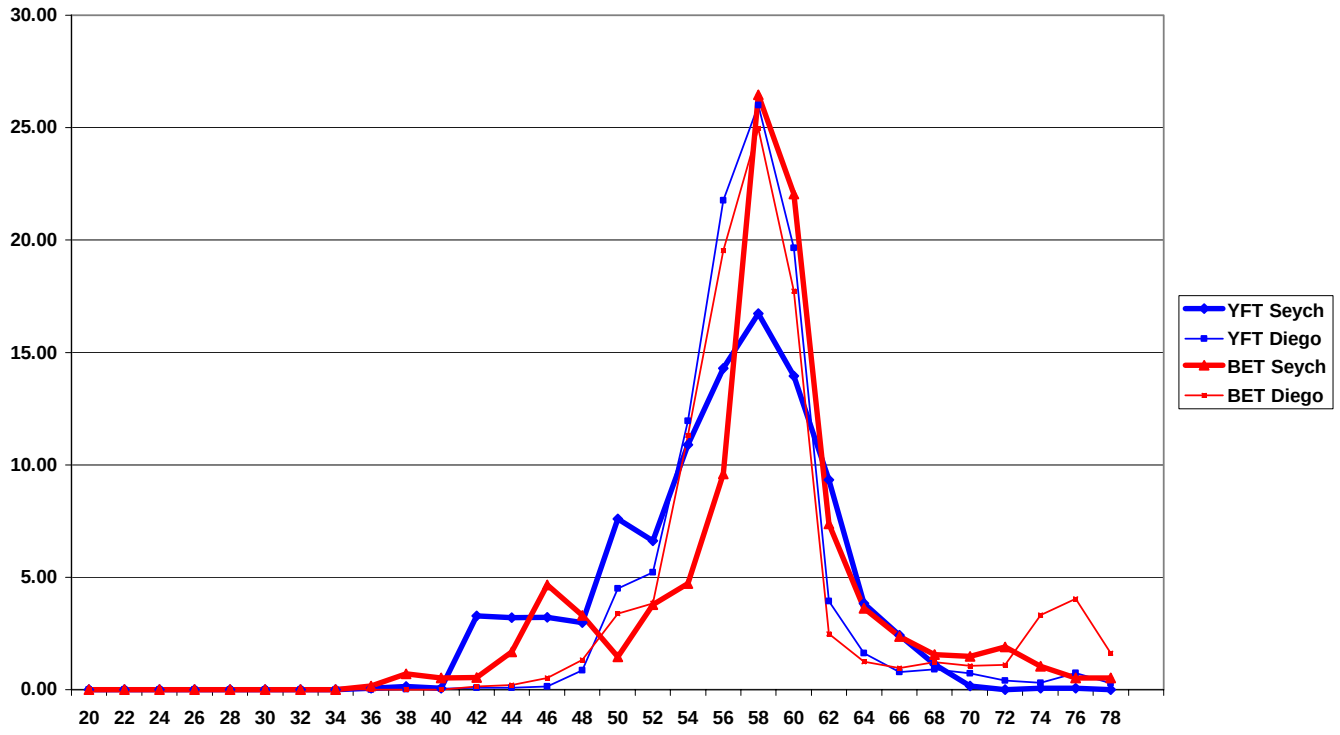


*Figure 4: Size distribution (in %) of the small yellowfin and small bigeye taken in the Mozambique area during the 2nd quarter of 1995 and measured in Victoria (Seychelles) and in Antsiranana (Madagascar)*

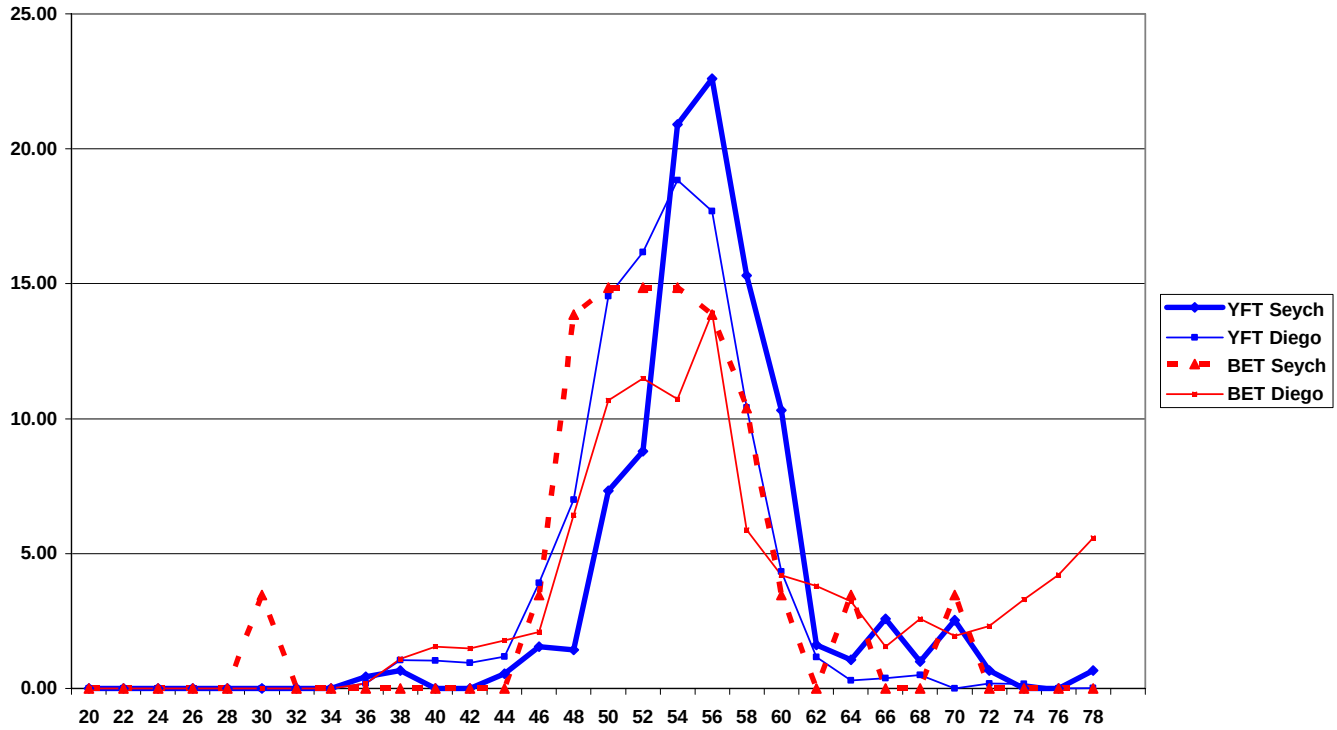


*Figure 5: Size distribution (in %) of the small yellowfin and small bigeye taken in the Mozambique area during the 2nd quarter of 1996 and measured in Victoria (Seychelles) and in Antsiranana (Madagascar)*

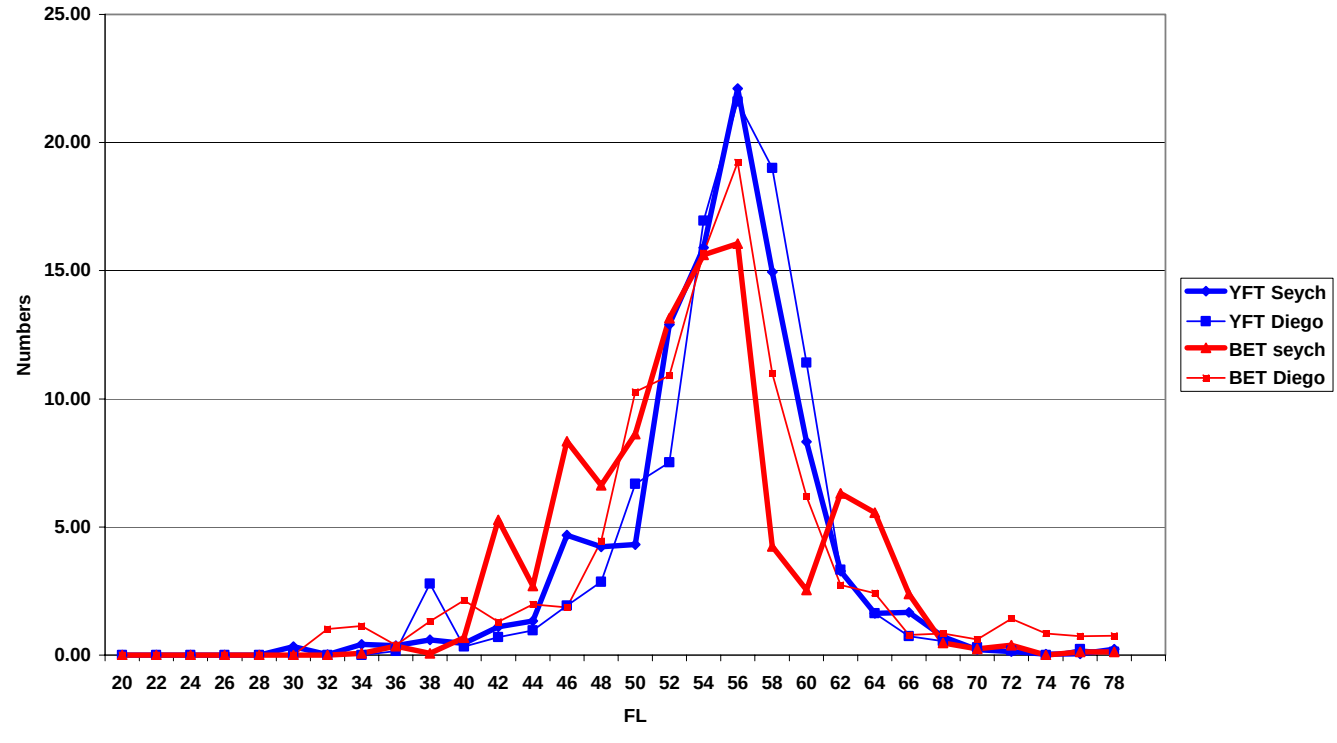


*Figure 6: Size distribution (in %) of the small yellowfin and small bigeye taken in the Mozambique area during the 2nd quarter of 1997 and measured in Victoria (Seychelles) and in Antsiranana (Madagascar)*

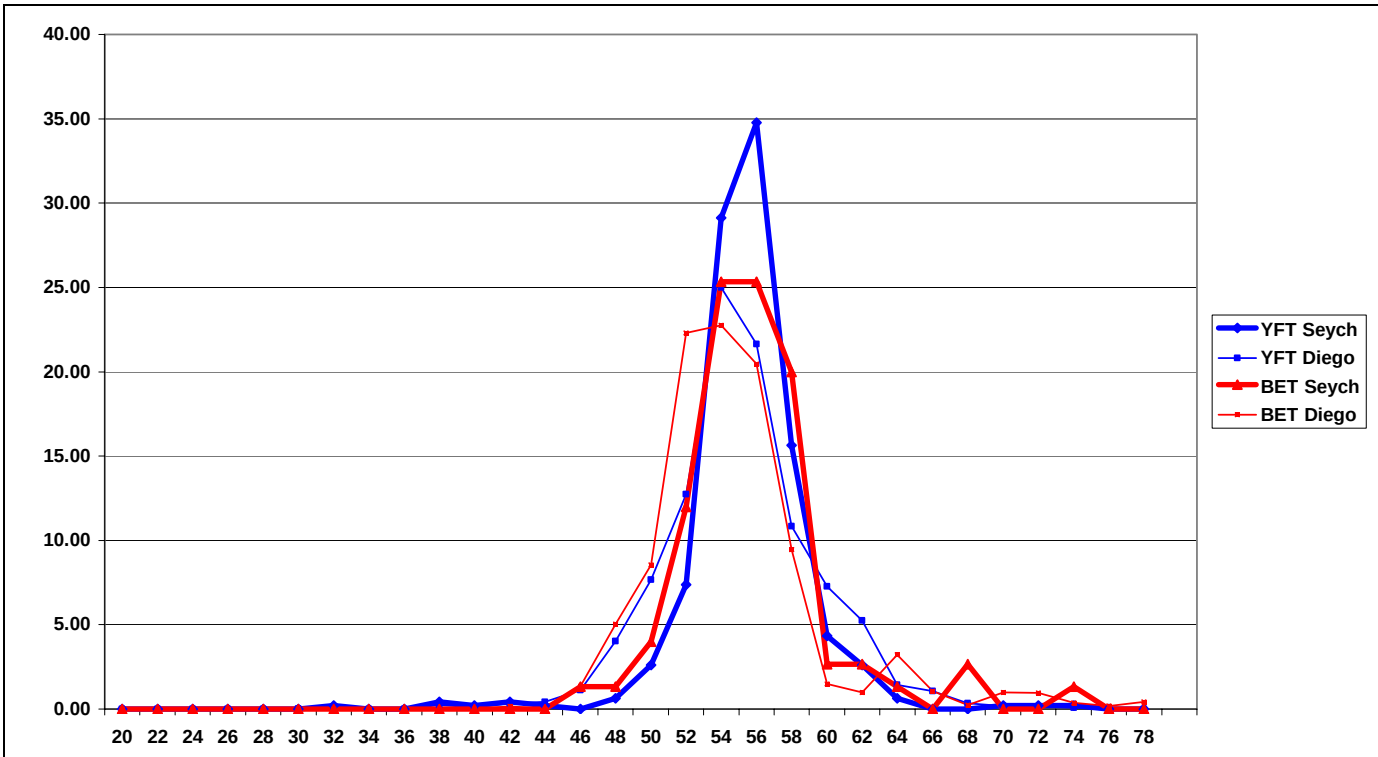


*Figure 7: Size distribution (in %) of the small yellowfin and small bigeye taken in the Mozambique area during the 2nd quarter of 1998 and measured in Victoria (Seychelles) and in Antsiranana (Madagascar)*

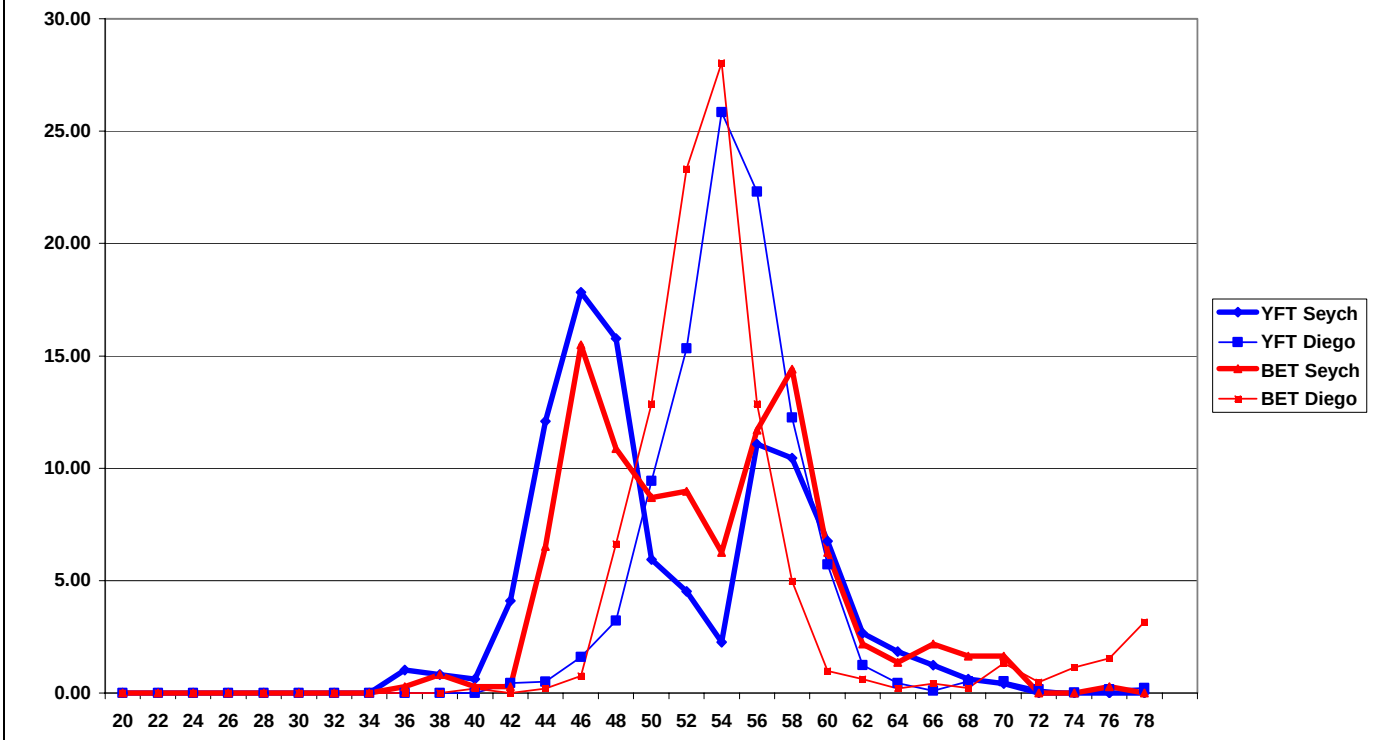


*Figure 8: Size distribution (in %) of the small yellowfin and small bigeye taken in the Mozambique area during the 2nd quarter of 1999 and measured in Victoria (Seychelles) and in Antsiranana (Madagascar)*

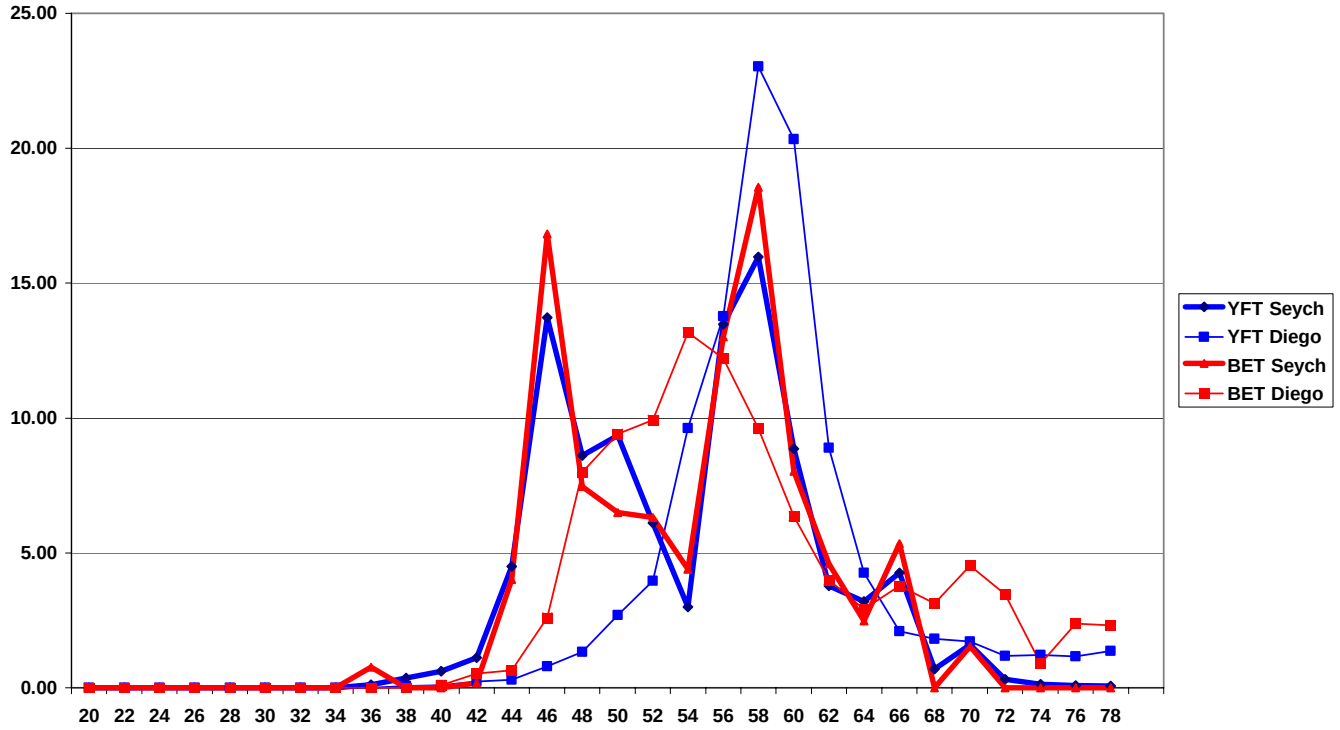


*Figure 9: Size distribution (in %) of the small yellowfin and small bigeye taken in the Mozambique area during the 2nd quarter of 2000 and measured in Victoria (Seychelles) and in Antsiranana (Madagascar)*

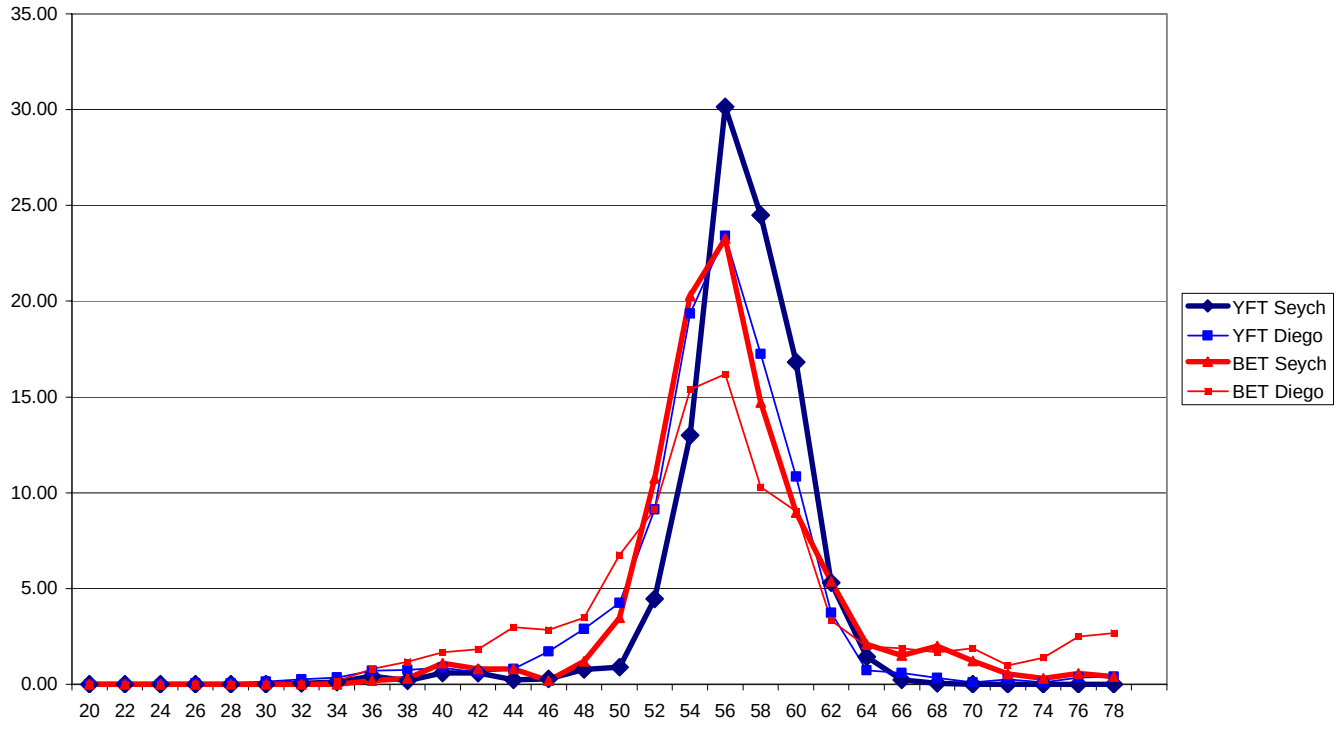


*Figure 10: Size distribution (in %) of the small yellowfin and small bigeye taken in the Mozambique area during the 2nd quarter of 2001 and measured in Victoria (Seychelles) and in Antsiranana (Madagascar)*

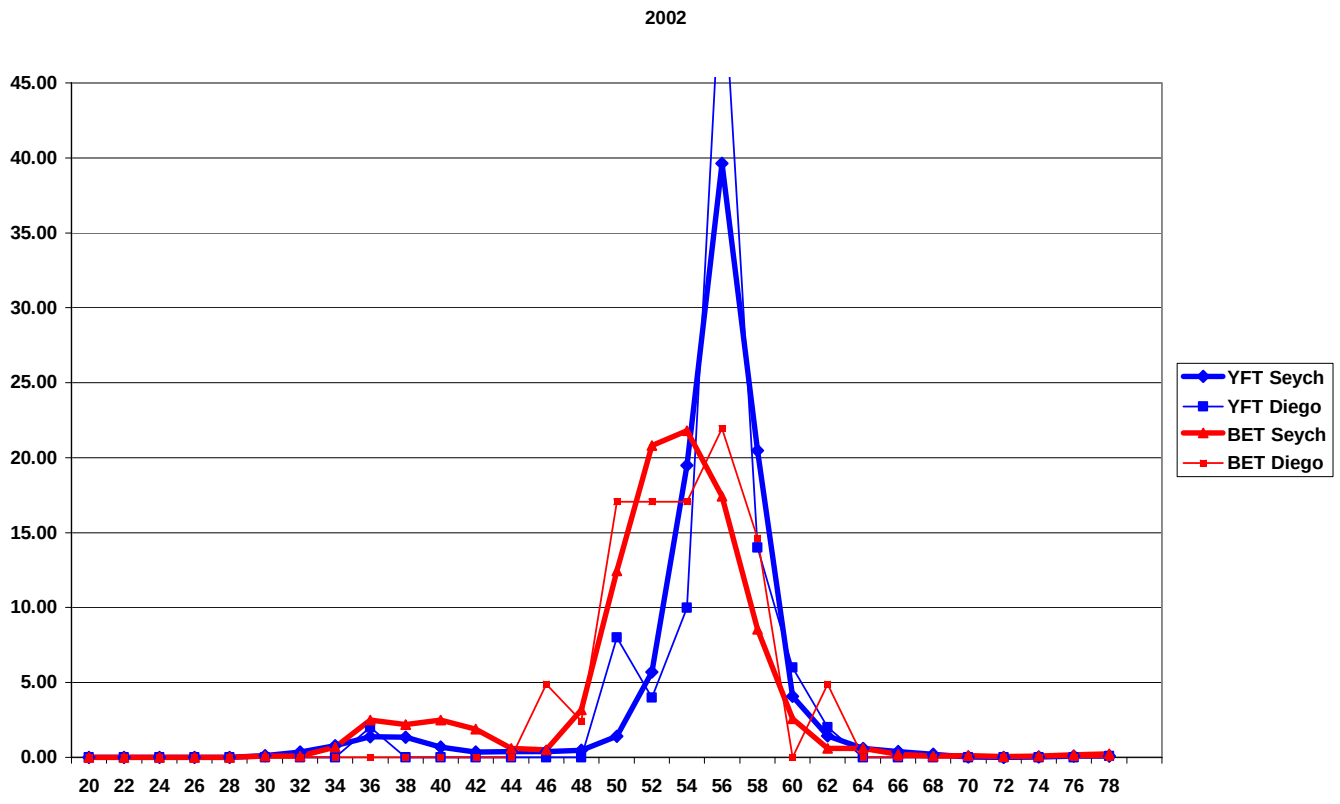


*Figure 11: Size distribution (in %) of the small yellowfin and small bigeye taken in the Mozambique area during the 2nd quarter of 2002 and measured in Victoria (Seychelles) and in Antsiranana (Madagascar)*

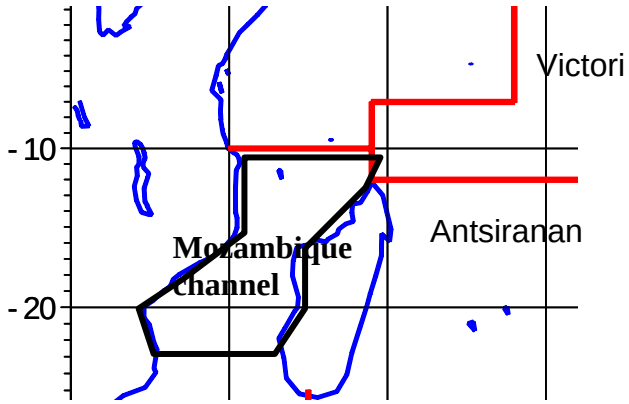


*Figure 12: Area used for the comparison of sizes sampled in Victoria and in Antsiranana*