WORKSHOP ON STOCK ASSESSMENT OF YELLOWFIN TUNA
IN THE INDIAN OCEAN

(Colombo, Sri Lanka 7-12 October, 1991)

FRENCH AND IVORY COAST YELLOWFIN PURSE SEINE FISHERY OF THE WESTERN INDIAN OCEAN (1984-1990)

by J.P. HALLIER *

INTRODUCTION

After the first purse seine surveys, conducted by French purse seiners in the Western Indian Ocean and spread out from December 1980 to mid-1983, the purse seine fishery was well established by the end of 1984.

The number of French vessels active in this fishery reached a peak of 23 vessels in 1985 and then after decreased to 17 vessels in 1986. Since it has more or less remained stable.

Overall, yellowfin catches represent nearly 50% of the French purse seine catch and this species has always been a prime target for this fishery.

1. YELLOWFIN CATCH

Despite the fluctuations in the number of vessels, the yellowfin catch remains around 40 000t (figure 1). The only exceptionnal year was 1988 with more than 54 000t.

The catch per vessel (Figure 2), all species together, shows an increase tendancy from an average of 3 500t in 1984/85 to 5 000t from 1987 to 1990.

This trend which is noticeable for skipjack as well as for yellowfin can reveal a better vessel efficiency. Results for 1989 and 1990 are down from those of 1988 but not so different of those of 1986 and 1987.

The global monthly yellowfin catch from 1984 to 1990 (Figure 3) expresses the seasonnality of yellowfin catches which peak generally during the first quarter of the year. Yellowfin catches appear to be exceptionnally high in 1988 and even during the first quarter of 1989.

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2. YELLOWFIN AND OTHER SPECIES CATCHES

Figure 4 gives the species composition of the French and Ivory Coast purse seine catches. As written in the introduction, yellowfin makes up nearly half of the total catch and this proportion remains more or less stable throughout the years (Figure 4).

3. YELLOWFIN ACCORDING TO THE TYPE OF SCHOOL

Yellowfins are mainly caught within free swimming schools (Figure 5). Overall from 1984 to 1990, 73% of the yellowfin were caught on free schools, the remaining (27%) on log schools. More or less, throughout the year there is a succession of YFT log school seasons and YFT free school seasons.

4. YELLOWFIN CATCH PER POSITIVE SET

From figure 6, one notice a slight increase in the yellowfin catch per positive set from an overall average of 10.8t for 1984-87 to 13.7t for 1988-90.

The improvement in the performances of the net and its hauling on board (i.e. a decrease of the duration of the fishing set - MONTAUDOUIN and HALLIER, 1990) might be responsible for this increase.

Pure yellowfin school sets show a decrease trend from 1984 to 1987 (Figure 7), this is to be compared to the decrease trend in the number of vessels (Figure 1). This trend was abruptly reversed in 1988 with more than 870 sets compared to an average of 575 sets for 1984-87. A sudden drop in 1989 (300 sets) was again followed by a 815 set year in 1990.

The proportion of the different size sets does not show any particular tendancy.

5. YELLOWFIN CATCH PER UNIT OF EFFORT

In terms of catch per fishing day, yellowfin CPUE is higher since 1987 (Figure 8), the highest figure is recorded in 1990 with 4.9 tonnes per fishing days.

If one use searching day as the measure of effort (i.e. time spent searching for the tuna schools), the trend remains the same (Figure 8) but then 1988 is the best year with 7.9t of yellowfin per searching day. From 1984 to 1986, the average CPUE was 4.2t of YFT/searching day against 6.7t of YFT/searching day on average from 1987 to 1990.

According to the first results, 1991 will most probably belongs to the group 1987-90 than to the group 1984-86.

6. YELLOWFIN CATCH BY SIZE

Whether yellowfin are caught on log or free schools their catch distribution by size is quite different (Figures 9 and 10). This situation has already bee described in previous papers, it should be kept in mind this has several important consequences, the main one are :

- one should not use log school size samples to calculate catch by size from free school catches,
- developping log school fishing will result in an increase of juveniles with the expected effect on the stock when too many juveniles are caught

7. YELLOWFIN CATCH AND EFFORT DISTRIBUTIONS

Yellowfin catch and effort distributions are illustrated in several figures whose reference will be given thenafter in the text.
The 1983 catch distribution (Figure 11) is not yet representative of the fisherie because there were only a feww vessels in activity most of the year and they were mainly in survey action.
From figures 11 and 12, where yellowfin catch distribution are represented for 1983 to 1990, one can notice that the overall fishing grounds have not changed much since 1984 when the fishery was well established :

- vessels are mainly fishing from 5 North to 10 South and from the African coast or 40 East to 80 East,
- the exception is the seasonal fishing season in the Mozambique Channel from March to mid-June,
- catches were quite small in this Channel in 84 and 85 but they become more developped in the following years with the exception of 88 when vessels from the French fleet hardly prospect that area. This is also obvious from the effort given in Figures 13 and 14.
- in 85 the fishing effort of the French fleet reached its highest level as previously stated in the introduction; a slight decrease is also noticeable in 90 as a few vessels departed for the Atlantic Ocean or were tied up into French port following the world market tuna crisis which lasted since the end of 1989.

CONCLUSION

The French fishery played a role of pioneer in the establishement and the developpment of purse seine fishing in Indian Ocean. A good scientific monitoring has been set up right at the beginning of the fishery through a joint research programme between ORSTOM and SFA.
The catch and effort data base as well as size sampling of the catch are now a major component in the fields of stock assessement and research (biology, migration and behaviour, tuna environnment relationships).

FIGURE 1 : NUMBER OF VESSELS, YFT CATCH
French & Ivory Coast purse seiners
(1984 - 1990)

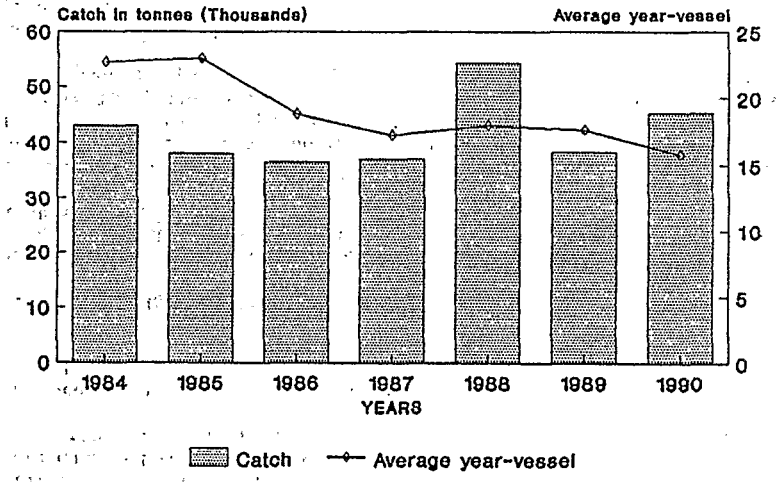


FIGURE 2 : CATCH PER VESSEL
French & Ivory Coast purse seiners
(1984 - 1990)

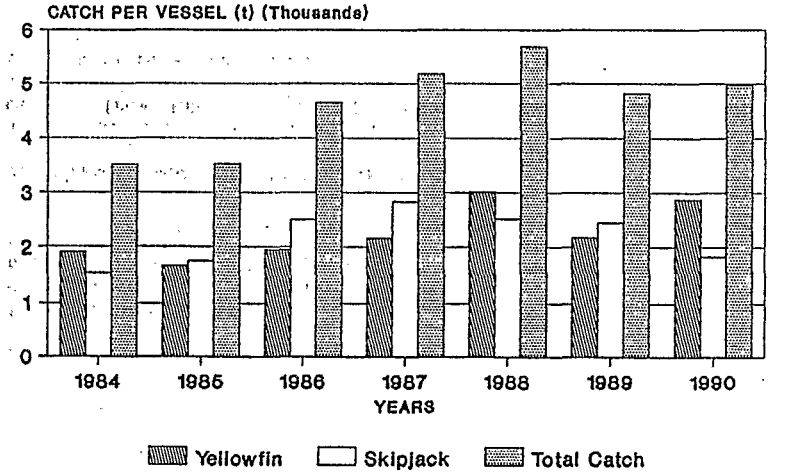


FIGURE 3 : GLOBAL MONTHLY YELLOWFIN CATCH (1984 - 1990)

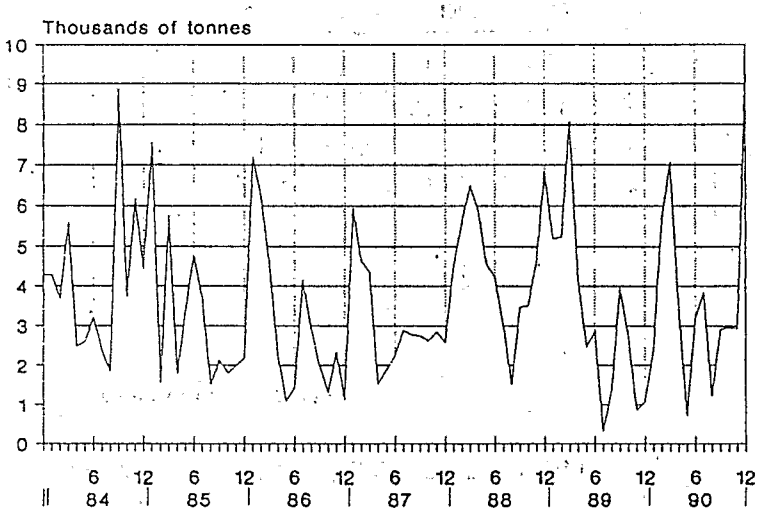


FIGURE 4 : CATCH SPECIES COMPOSITION
French & Ivory Coast purse seiners
(1984 - 1990)

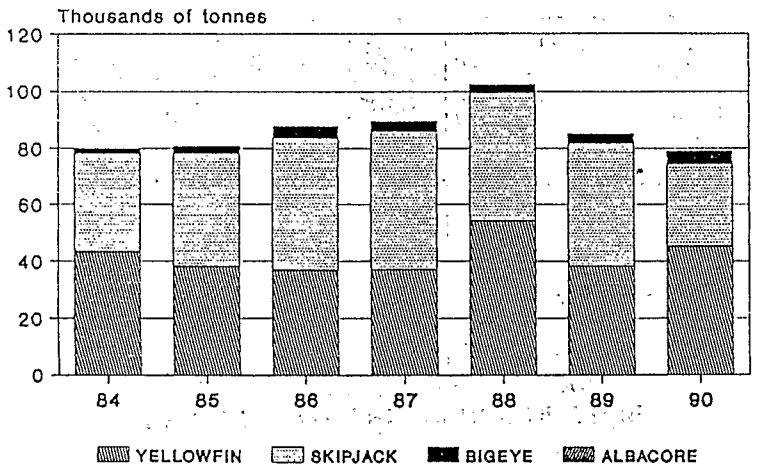


FIGURE 5 : MONTHLY YELLOWFIN CATCH ON LOG AND FREE SCHOOLS (1984 - 1990)
French & Ivory Coast purse seiners

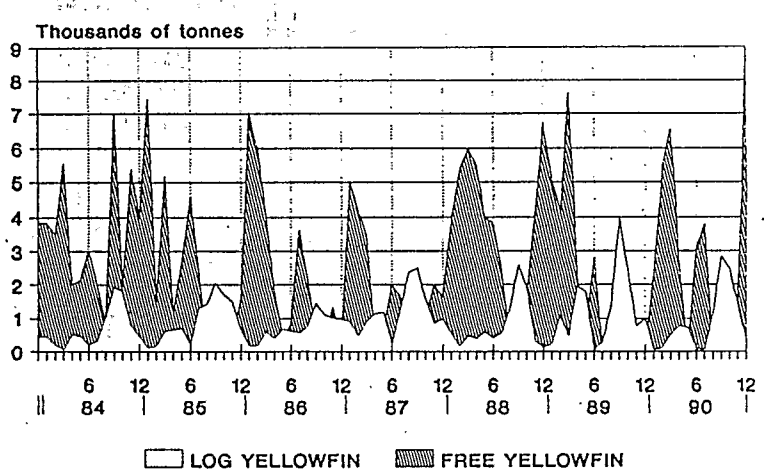


FIGURE 6 : YELLOWFIN CATCH PER POSITIVE SET (1984 - 1990)
French & Ivory Coast purse seiners

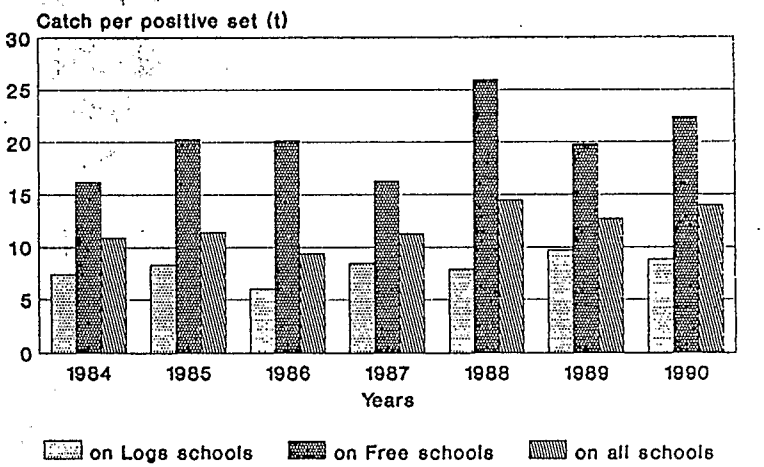


FIGURE 7 : SIZE FREQUENCY OF PURE YELLOWFIN SETS (1984 - 1990)
French & Ivory Coast purse seiners

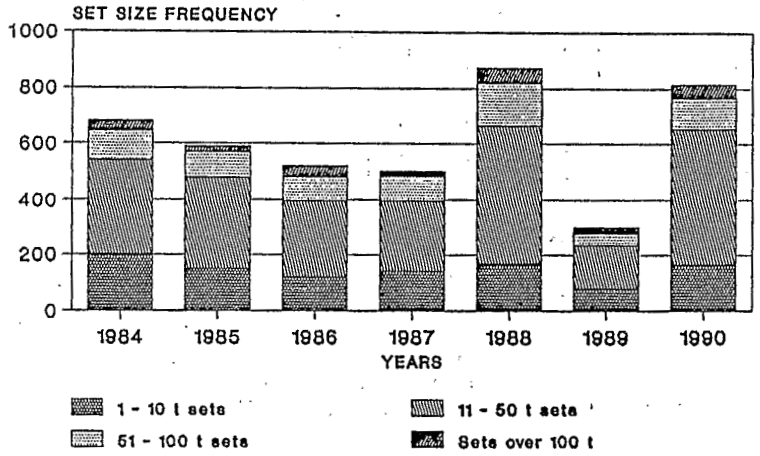
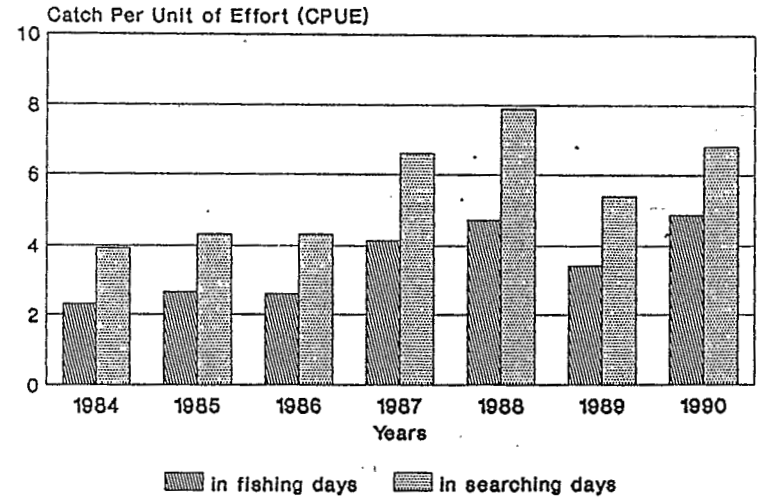


FIGURE 8 : CPUE OF YELLOWFIN (1984 - 90)
French & Ivory Coast purse seiners



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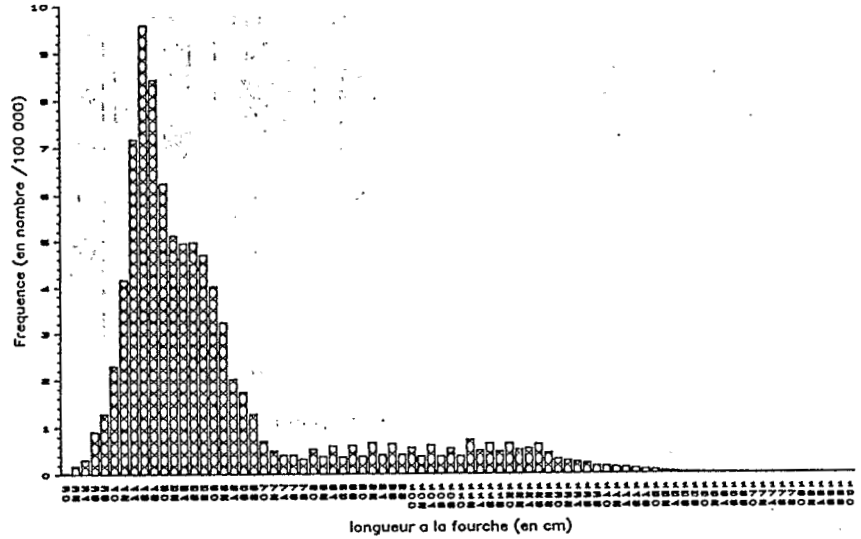

Figure 9: Yellowfin catch by size of purse seine fishery on log schools (1984-89)

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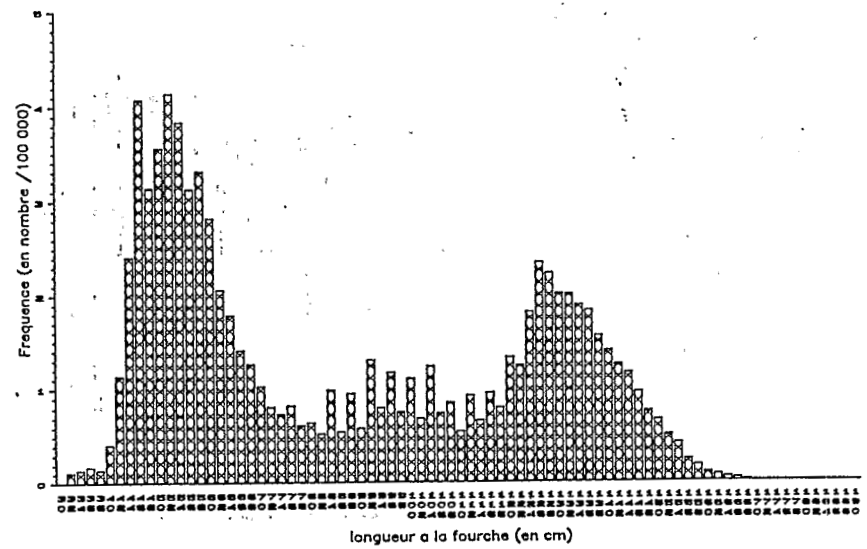


Figure 10: Yellowfin catch by size of purse seine fishery on free schools (1984-89)

FIGURE 11

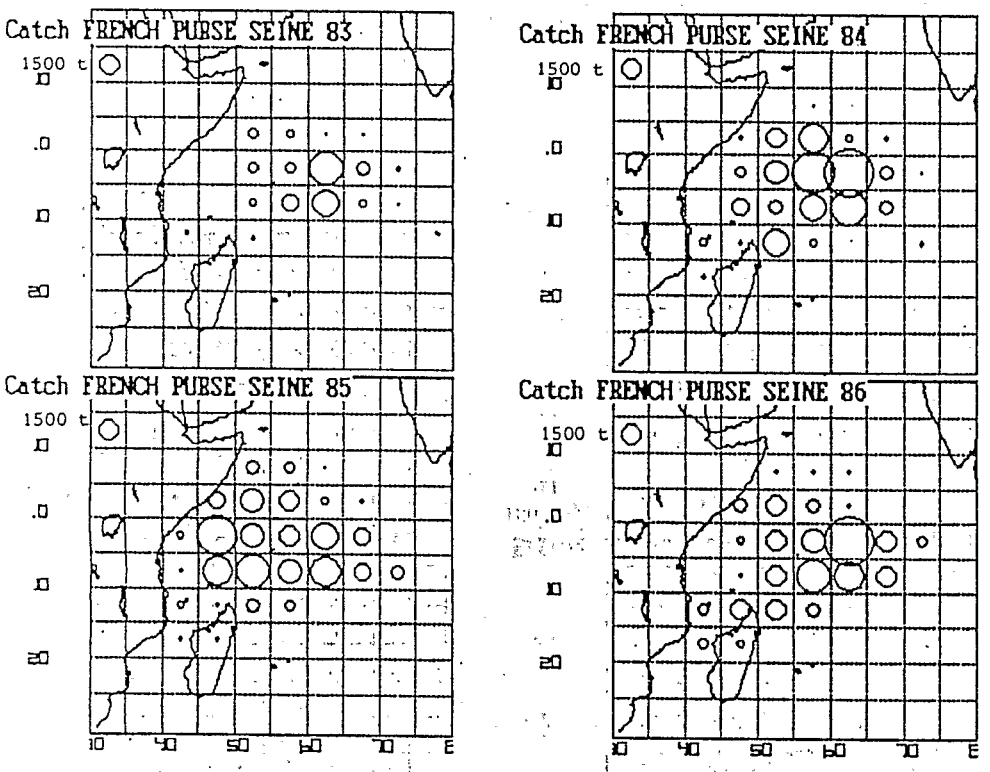


FIGURE 12

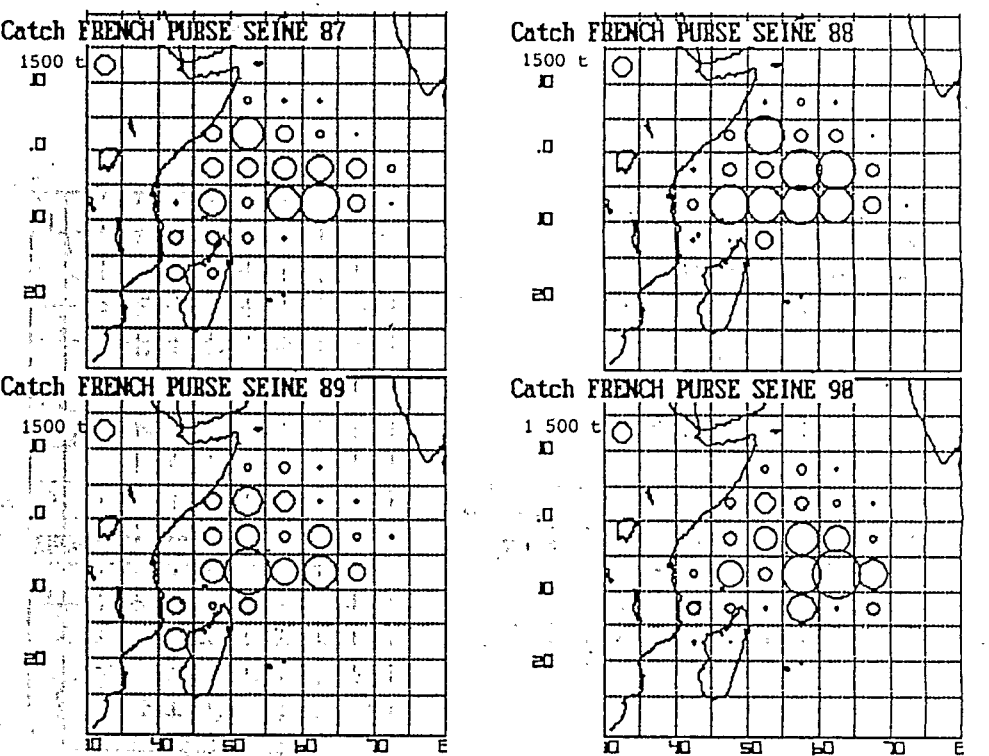


Figure 13

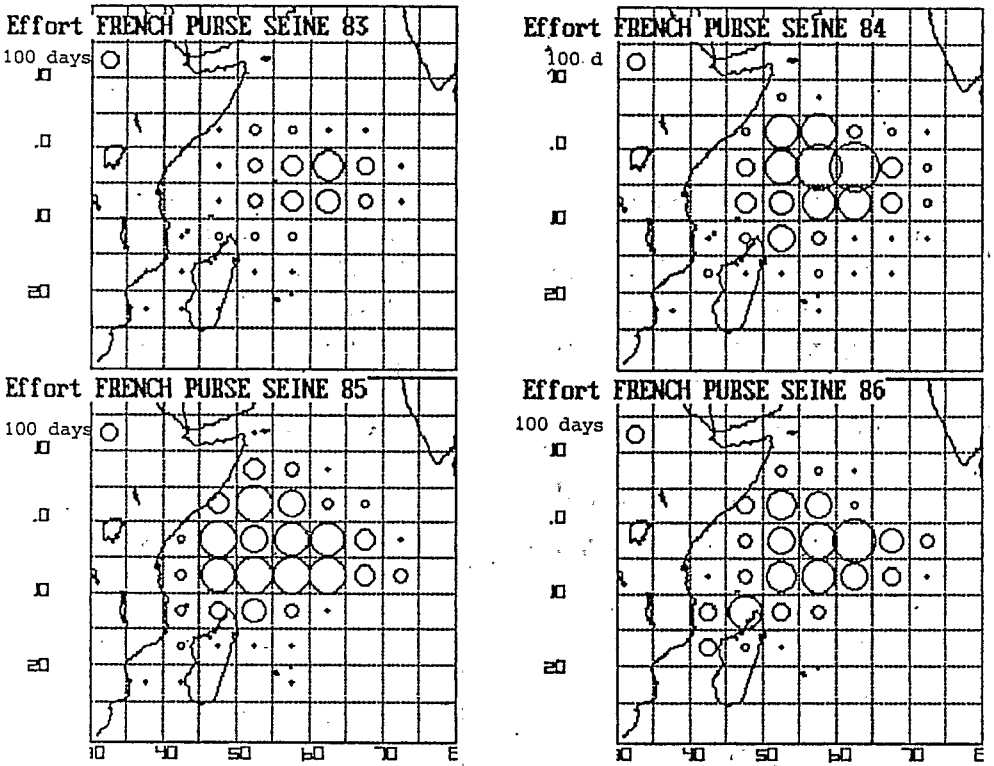
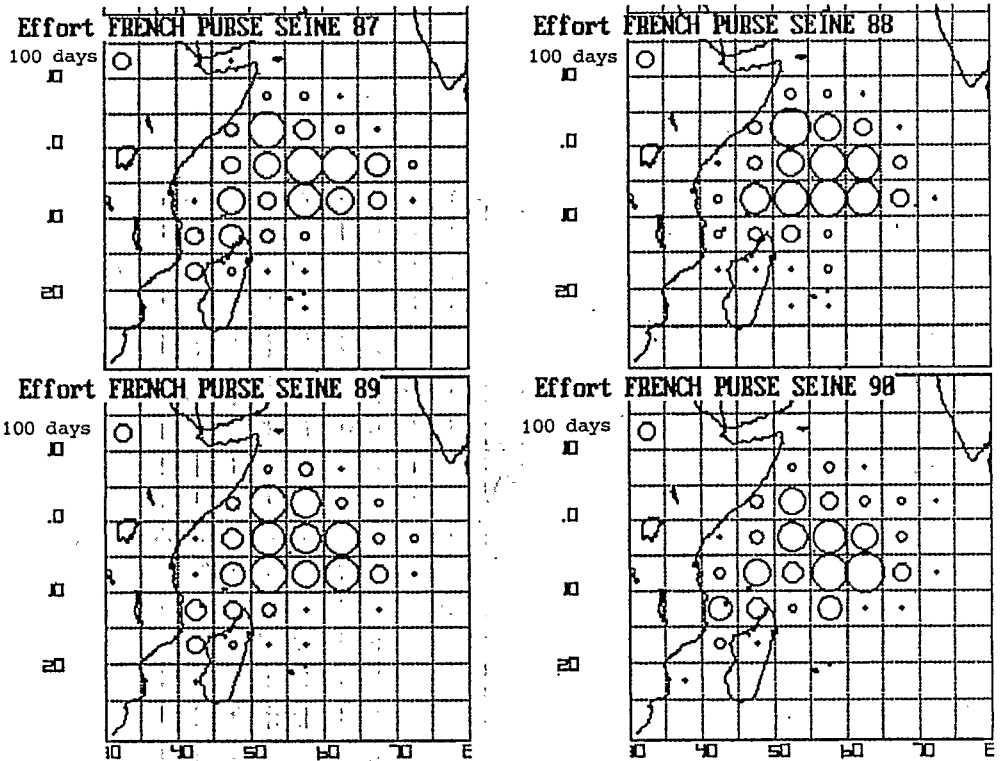


Figure 14



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