

RELATIONSHIP BETWEEN EFFORT AND FISHING MORTALITY IN THE ATLANTIC ALBACORE SURFACE FISHERY

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An interesting point of assessment works consist of checking the possible relationship between fishing effort recorded from fleet activity, and the corresponding instantaneous fishing mortality rate, estimated by means of methods independent of fishing effort.

This point has reached now a special importance because it has been shown how, in some cases, and particularly in short-lifespan pelagic stocks, an increase in catchability can be the result of decreasing stock size, probably caused by a bigger concentration of the stock, which "tries" to maintain school sizes, (McCall, 1976; Ulltang, 1976, 1978).

It seemed therefore interesting to us to explore the kind of relationship existing between effort and fishing mortality in the albacore surface fishery of the North Atlantic.

As it is known this fishery catches specimens from 2 to 5 years old, but the main bulk of catches consists of 3 and 4 years old. Two kinds of gears are used: trolling and baitboat.

Fishing effort has been traditionally measured in fishing days, both in trolling and baitboat. Three countries share the fishery: Spain, France and Portugal; Spanish effort represents about 70% from the total effort in this fishery in the period 1973-1977. The effort series we disposed of is shown in table 1. Trolling effort was converted to baitboat effort, multiplying the series by a factor equal to the ratio between baitboat CPUE and trolling CPUE such as described by Garcés (SCRS/80/62). Results were practically the same without this conversion ($R^2 = 0.9201$).

VPA's have been made for cohorts 1964 to 1974, which allowed the estimation of instantaneous fishing mortality rates by years-class for the period 1967-1977. These analysis are described by Bard and Garcés (1980).

From these data a yearly mean F for 3 and 4 years old weighed by number at sea, was computed. Figure 1 shows the linear regression between F 's and the corresponding yearly nominal effort. R^2 was estimated as 0.895790, corresponding to a value of the correlation coefficient of 0.946462.

It seems, therefore, that nominal effort could be used as a predictor of fishing mortality for these age-classes, exploited in the surface fishery.

In consequence of what was said above, a prediction has been made about the instantaneous fishing mortality F_{3-4} for 1978 and 1979. In these years the fishing efforts are known. These estimations are:

YEAR	f	\hat{F}_{3-4}
1978	28,937	0.25
1979	23,588	0.15

References

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Año	f	F ₃₋₄
1967	52.924	0.73
1968	52.684	0.72
1969	48.157	0.57
1970	35.660	0.49
1971	47.628	0.57
1972	33.968	0.29
1973	35.403	0.36
1974	29.730	0.29
1975	33.067	0.22
1976	32.211	0.30
1977	28.802	0.30

Table 1.

f = surface fishing effort of North Atlantic albacore fishery in baitboat fishing days.

F₃₋₄ = mean instantaneous fishing mortality rate for 3 and 4 years old weighed by number at sea.

