

ANNUAL MEETING - JUNE 1968Recent Changes in the Size Composition of  
Canadian Swordfish Catches

by J.S. Beckett and B.H. Tibbo  
Fisheries Research Board of Canada  
Biological Station, St. Andrews, N.B.

The Canadian fishery for swordfish started in the early years of this century, but annual landings seldom exceeded 500 metric tons until 1930. Between 1930 and 1963 landings ranged between 500 and 1500 metric tons except for a brief period in the late 1950's when the catch exceeded 2000 metric tons and in 1959 reached a high of 4000 metric tons. Prior to the end of the 1962 season the fishery was prosecuted entirely by harpoon and was restricted to the summer months. In the latter part of that year, however, surface longlining was introduced. This had the major effect of greatly increasing (a) the catch per day, (b) the size range of fish taken, (c) the area fished and (d) the length of the season. Landings increased to over 7400 metric tons in 1963, decreased slightly the following year and fell markedly to 4600 metric tons in 1965. Since then the catch has remained near the 1965 level.

The size composition of catches, calculated from samples measured at sea or during unloading, is given in Figure 1. These figures show that there has been a steady decline in the average weight of the catch since the introduction of longlining. An average weight using more numerous samples, for which only the numbers of fish and total weight for each trip are available, emphasizes the decline and suggests that averages from detailed samples were low in 1959 and 1964, but were high for 1967. The sample sizes and average weights are compared in Table I.

The decrease in average size from approximately 120 kg to 72 kg is probably due to a number of factors all associated with the introduction of longlining; the capture of smaller fish, the expansion of the fishing area, the length of the fishing season, and the effect of the increased effort on the stock.

Harpooned fish are exclusively female and are usually large, averaging about 150 kg. In contrast the size of longlined fish is generally much smaller, due to the inclusion of both males, which seldom attain 150 kg, and small females. Size compositions of catches made by the two methods are compared in Figure 2.

Longlining is carried out over a much wider area than harpooning, and for a longer season. Harpooning is limited to an area near the edge of the continental shelf and significant landings are made only between the middle of June and the end of September. Since the introduction of longlining a year-round fishery has developed in an area bounded by the Gulf Stream and the edge of the continental shelf between Cape Hatteras and the Flemish Cap. The samples examined for size show considerable variation between fish from different areas and from the same area at different times of the year. Such area differences are illustrated by the size composition of catches from the vicinities of the Grand Banks and Georges Bank shown in Figure 3. The expansion of the longline fishery into areas yielding fish of a different, and usually smaller, average size resulted in decreases in the overall size. One such area only recently fished is that south of the Grand Banks where large catches of small fish have greatly reduced the size composition of the landings from the area, in comparison with previous years. Changes in the overall average for a year can also be caused by changes in the proportions of the total landings from different areas, or by unusually successful fishing from one area. In 1967 there were substantial increases in the landings from areas south of the Grand Banks and off

Cape Hatteras, both areas of smaller fish. This was a major effect on the size composition for 1967 as shown in Figure 1. The increased fishing effort may have reduced the average size, as might be expected when pressure on a partially exploited stock is increased. However, the size composition of the longline catches from any particular area at any particular season of the year does not appear to have altered significantly. Also, the average size of harpooned fish has not changed appreciably. This may, however, be expected since only fish of a certain size appear to be available to the harpoon fishery.

Table I. Proportions of total annual catch of swordfish sampled and means of grouped and individual weights (dressed).

Year	Grouped Weights		Individual Weights	
	% of landings	Average wt.	% of annual landings	Average wt.
1959	6.7	90.7	3.7	84.8
1960	49.2	97.8	9.9	96.6
1961	38.7	91.6	10.3	89.8
1962	35.3	89.4	6.4	87.1
1963	34.4	77.6	11.2	81.6
1964	41.7	70.8	10.0	87.6
1965	61.6	84.9	11.5	85.8
1966	58.6	61.7	12.1	66.7
1967	59.5	51.7	22.3	55.3

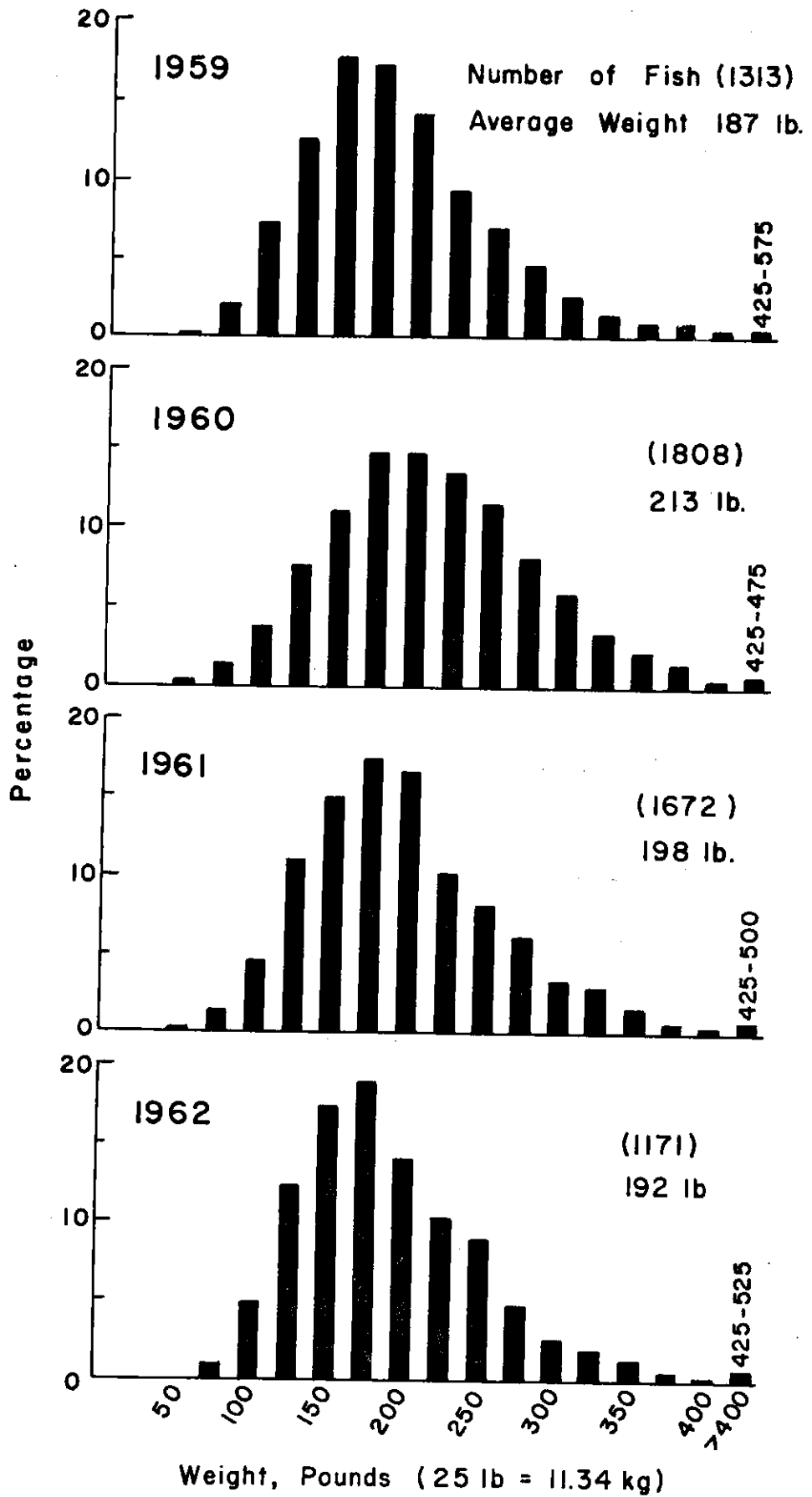


Fig. 1(a). Size composition of swordfish samples 1959 to 1962.

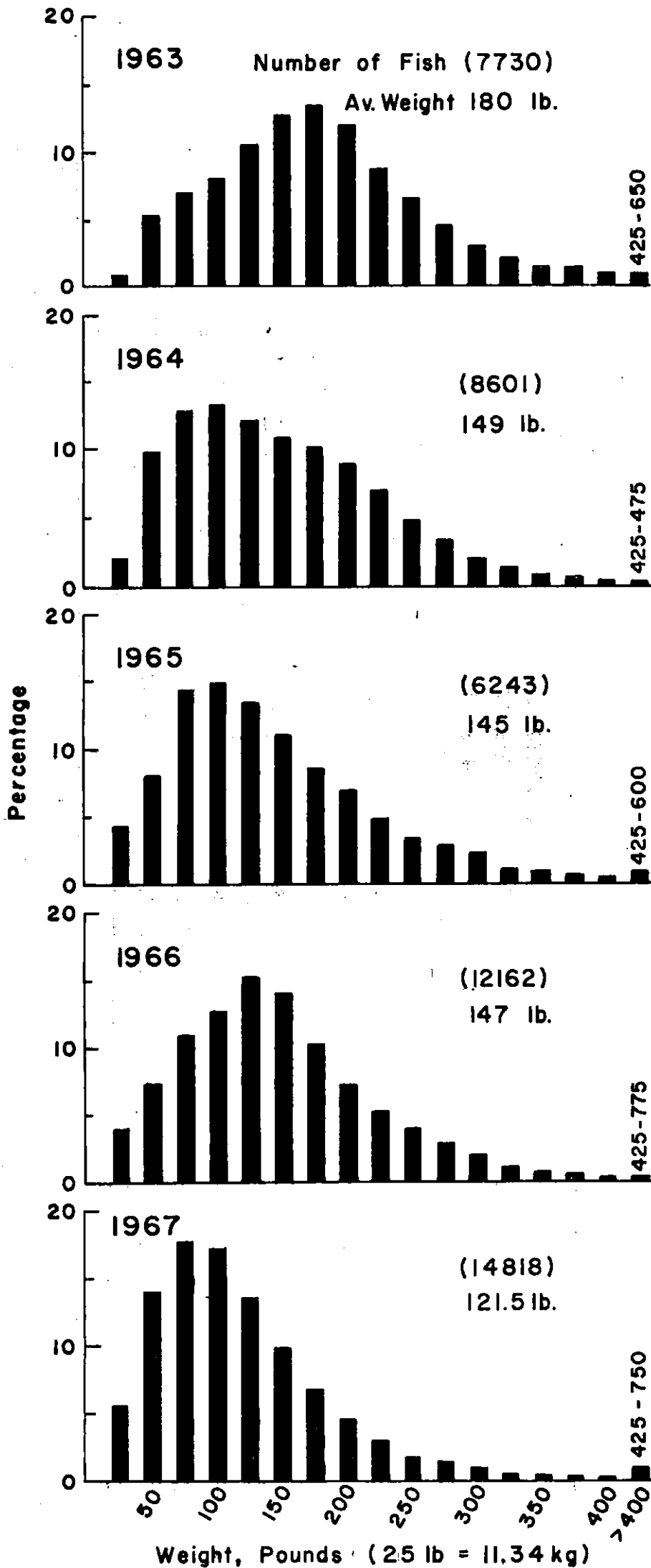


Fig. 1(b). Size composition of swordfish samples 1963 to 1967.

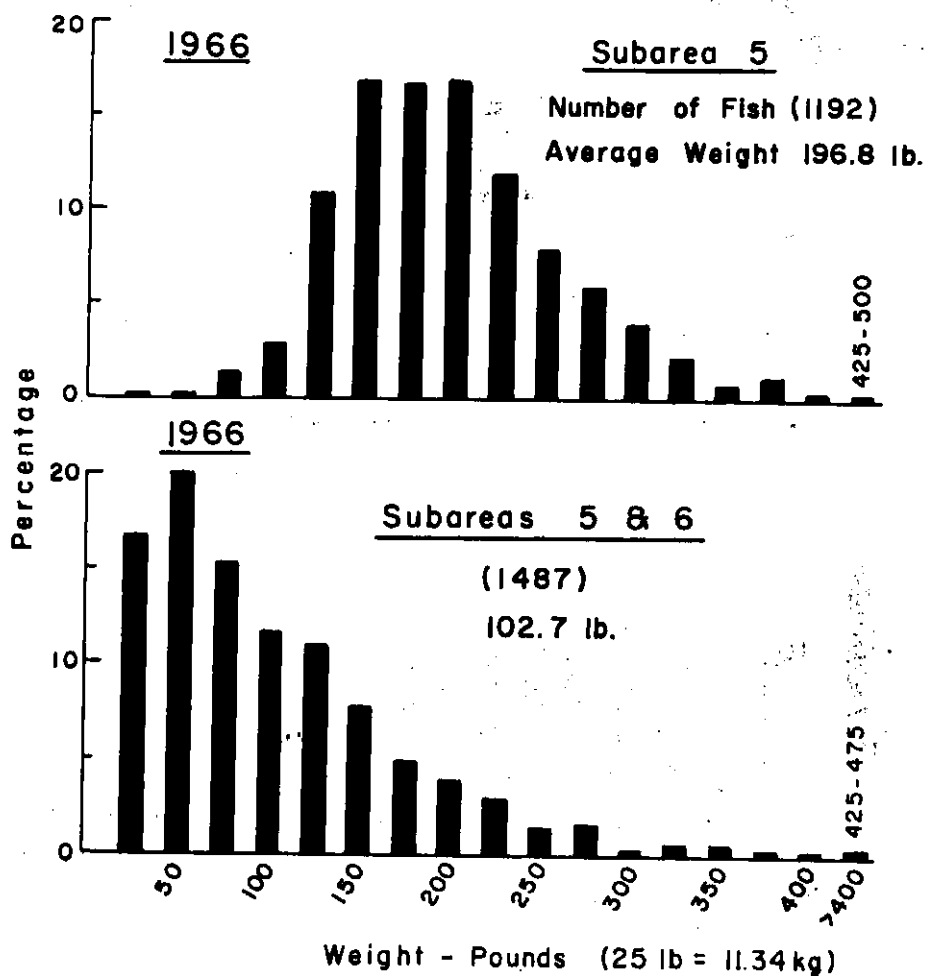


Fig. 2. Differences in size composition of swordfish caught in the same area by harpoonin (upper) and longlining (lower).

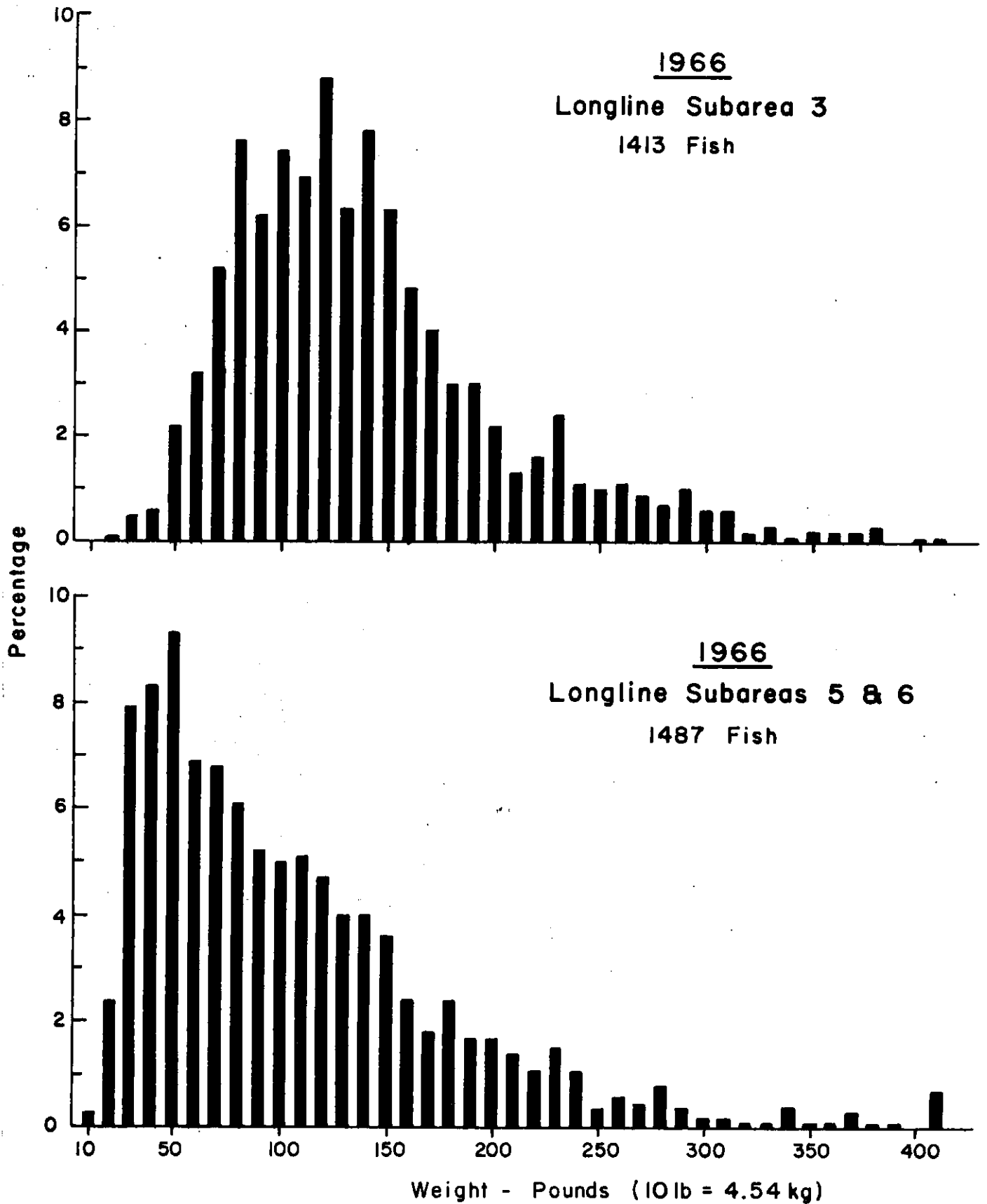


Fig. 3. Size composition of swordfish landings from two different areas by the same fishery method.