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Recent selection experiments with the approved ICNAF topside chafer

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At its 1965 meeting, the ad hoc Committee on ICNAF Trawl Regulations requested new information on the effect of the ICNAF topside chafer on codend selectivity (1965 Meeting Proc. 13). In compliance with this request, the Institut fur Fangtechnik, Hamburg, conducted some appropriate experiments during the 12th cruise of FRV WALTHER HERWIG in West Greenland waters.

The investigations were carried out under bad weather conditions (SE 7/8 Beaufort, snow showers) on 6 and 7 December 1965, on the eastern slope of Fyllas Bank (Div. 1D), where small immature cod were concentrated in depths between 80 and 110 m (1. 7°C).

To find out whether the ICNAF chafer had any effect on selectivity, a series of 4 successful hauls was to be made with a polyamide codend without chafer. Then the chafer was to be attached to the codend, and a further series of at least 4 hauls made. This plan, however, was upset by a tragic accident. While shooting the trawl with the protected codend the third time, a member of the crew fell overboard. The man could not be rescued from the sea. On that the experiments were stopped, and WALTHER HERWIG started the homeward voyage one day earlier than originally intended.

Consequently only the results of two hauls with chafer can be compared with those of four hauls without chafer. The small number of hauls certainly reduces the value of the experiments, but not to such an extent that their results should remain unpublished.

During all of the trials 6, 594 cod were caught in the codend and 3, 794 cod in the cover. The total length of each fish was measured to the nearest centimeter. Fig. 1 shows the relative length composition of the total cod catch. It can be seen that large fish of more than 60 cm were very sparsely represented. Most abundant were cod between 37 and 55 cm length (mainly year-classes 1961 and 1962) followed by those between about 26 and 36 cm (mainly year-class 1963). This length distribution proved extremely favourable for the experiments, because the selection range of the 122 mm codend used corresponded with the range of well-represented fish lengths. The catches, ranging from 18 1/2 to 40 1/2 baskets*) per 1 1/4 hours' fishing time, were uniformly composed. Cod were clearly predominant; other fish (Hippoglossoides platessoides, Anarhichas lupus, Anarhichas minor, Cyclopterus lumpus) and invertebrates were caught in small quantities (compare Tables 1 and 2).

The chafer was rigged according to the ICNAF specification: a rectangular netting piece made of the same material as the codend (Table 1) was attached with its forward edge across the upper side of the codend and with its lateral edges to the selvedges in such a manner that the codend was covered from 23 meshes ahead of the cod-line (i. e. four meshes in front of the splitting strap, if such a strap would have been used) to five meshes ahead of the cod-line mesh (i. e. the four aftermost codend meshes were not covered). The width of

*) Large plastic baskets were used. The average net weight of one basket filled with cod was 68. 5 kg.

this netting (7.5 m) was one and a half times the width of the codend. The average mesh size of the chafer (127.5 mm) was slightly larger than that of the codend (122.2 mm).

It is unnecessary to give a detailed description of the experiments in the text of this paper, because all the interesting particulars are included in the tables and figures. One point, however, remains to be mentioned: the selection curves shown in Fig. 2 and 3 are based on smoothed percentages of retained fish (three-point moving averages). They are fitted by eye.

The selection data obtained from combined hauls are compiled in Table 1. Both the set of 4 hauls without chafer and the set of 2 hauls with chafer gave the selection factor 3.38. The selection ranges (9.4 cm without chafer and 8.5 cm with chafer) differed only slightly. The selection curves (Fig. 2) closely resembled one another. In other words, the chafer has not influenced the selectivity of the codend.

Since cod were sufficiently numerous in each catch, reliable selection data could also be obtained from each individual haul (Table 2 and Fig. 3). The selection factors for the 4 hauls made without chafer were found to be 3.28, 3.29, 3.40 and 3.44 (mean selection factor 3.35 ± 0.04). The corresponding selection ranges varied between 8.7 and 10.3 cm. In the two hauls made with chafer, a selection factor of 3.37 was found for each haul. The selection ranges were 8.2 and 8.9 cm. Thus the results presented on a haul-by-haul basis also show that the codend selectivity was unaffected by the presence of the chafer.

According to ICNAF Regulations, the mesh size of the chafer may be the same as or larger than that of the codend. In the given instance, the chafer mesh size was larger by 5 mm. It is most unlikely that the experiments would have yielded another result, if the meshes of both the codend and the chafer had been of the same size.

It may be concluded from these experiments, which included catches ranging from 1.25 to 2.75 metric tons, that the ICNAF chafer rigged in the prescribed manner does not impair the codend selectivity for cod.

Table 1: Selection data for grouped hauls

	Without chafer	With chafer
Ship	FRV WALTHER HERWIG, length o.a.83.3 m, 2000 h.p.e.	
Gear	German standard roundfish bottom trawl, 140' groundrope	
Date	6./7.12.1965	7.12.1965
Greenland time	16.40-01.45 (dark)	16.20-20.45 (dark)
Locality	Inner edge of Fyllasbank (63°56'N; 52°28'W)	
Depth range (m)	80-110	
Species studied	Cod	
Experimental method	Topside cover	
Cover	ICES specification, but double as wide as the codend	
Material	Nylon continuous	
Runnage (m/kg)	1200	
Tex	23 tex x 11 x 3	
Braiding	Single twine	
Twine construction	Twisted	
Mesh size (mm)	60	
Codend and chafer material	"Perlon" continuous	
Runnage (m/kg	200	
R..tex	R 5000 tex	
Braiding	Double twine	
Twine construction	Twisted	
No. of hauls	4	2
Av.duration of haul (min.)	75	75
Av.towing speed through water(kn)	4,6	4,3
Type of mesh gauge	ICES gauge - 4 kg pressure	
Codend mesh size;mean ± s.e.(mm)	122.2±0.2	122.2±0.3
Range (mm)	116-128	115-129
No.of measurements	211	106
Chafer mesh size (mm)	-	127.5
-75% selection range (cm)	9.4	8.5
No.of cod in sel.range codend	1279	727
No.of cod in sel.range cover	1152	705
Total No. of cod codend	4239	2355
Total No. of cod cover	2246	1548
Av. quantity of cod codend (baskets)	18 (=1233 kg)	19 1/3 (=1324 kg)
Av. quantity of cod cover (baskets)	4 3/4 (= 325 kg)	6 (= 411 kg)
other fish codend (baskets)	4	5
other fish cover (baskets)	1/3	3/4
invertebrates codend (baskets)	1/2	1/2
invertebrates cover (baskets)	+	+
50% retention length (mm)	413	413
Selection factor	3.38	3.38

Table 2: Selection data for individual hauls

	Without chafer				With chafer	
Haul No.	64	65	66	67	68	69
Duration of haul (min.)	75	75	75	75	75	75
Codend mesh size; mean ± s.e. (mm)	122.1±0.3	122.2±0.3	122.3±0.3	122.2±0.3	121.9±0.4	122.4±0.3
Range (mm)	116-127	116-127	116-127	116-128	115-129	116-128
No. of measurements	53	52	53	53	53	53
Chafer mesh size (mm)	-	-	-	-	127.5	127.5
25-75% selection range (cm)	10.0	9.3	8.7	10.3	8.2	8.9
No. of cod in sel.range codend	197	452	353	252	381	338
No. of cod in sel.range cover	177	423	315	214	355	353
Total No. of cod codend	574	1557	1178	930	1447	908
Total No. of cod cover	418	796	658	374	861	687
Quantity of cod codend (baskets)	9 1/2 (= 651 kg)	27 3/4 (=1900 kg)	19 (=1302 kg)	15 3/4 (=1079 kg)	24 1/2 (=1678 kg)	14 1/4 (= 976 kg)
Quantity of cod cover (baskets)	2 3/4 (= 188 kg)	7 (= 480 kg)	6 (= 411 kg)	3 1/2 (= 240 kg)	6 2/3 (= 456 kg)	5 1/2 (= 377 kg)
other fish codend (baskets)	5	5 1/2	3	2	5 1/2	4 1/2
other fish cover (baskets)	1/4	1/4	1/2	1/4	2/3	1
invertebrates codend (baskets)	1	-	1	-	1/2	1/2
invertebrates cover (baskets)	+	-	+	-	+	+
50% retention length (mm)	402	415	421	401	411	412
Selection factor	3.29	3.40	3.44	3.28	3.37	3.37

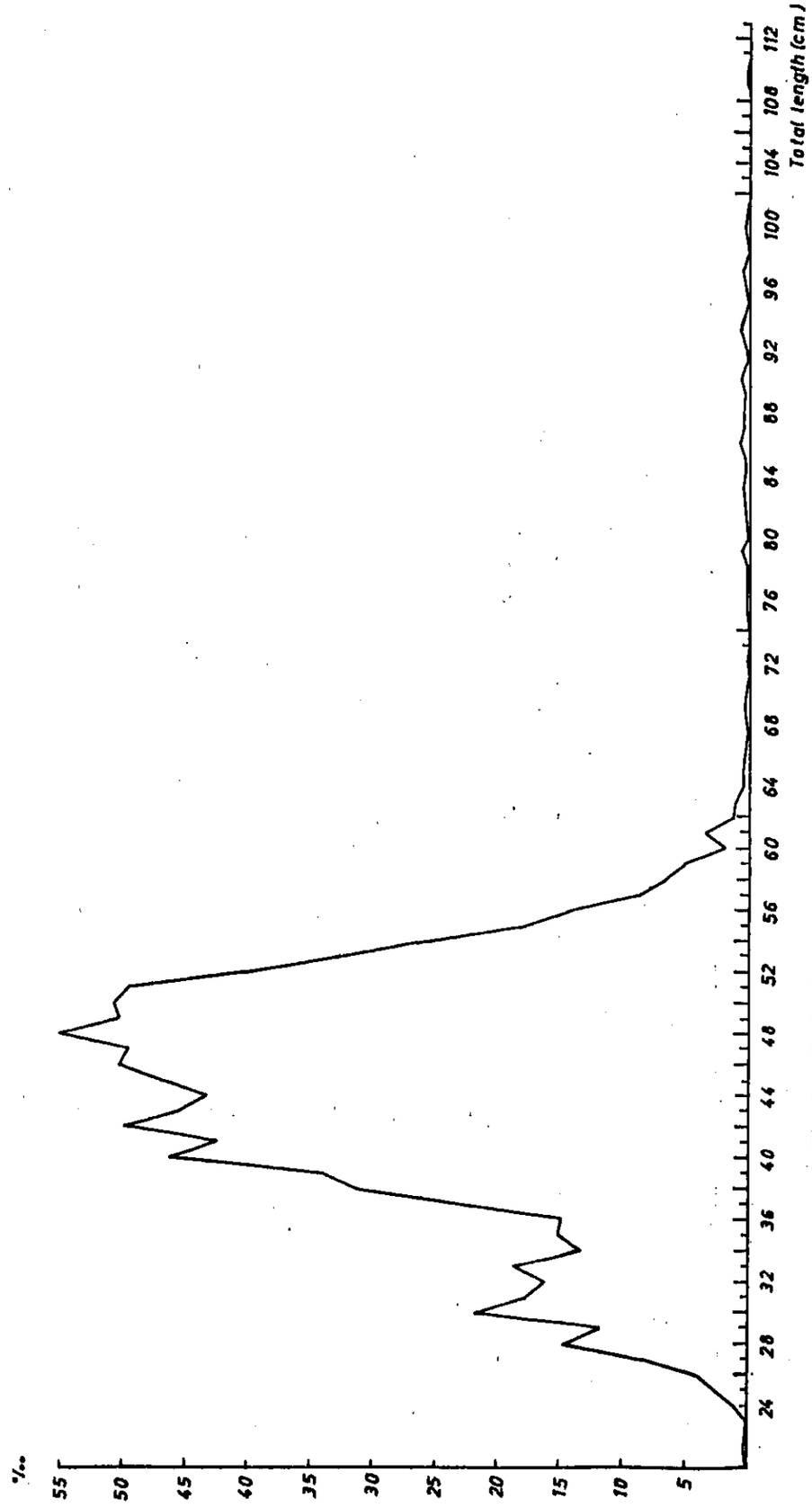

Fig.1: Relative length composition of cod (codend+cover)

6 hauls, n = 10 388

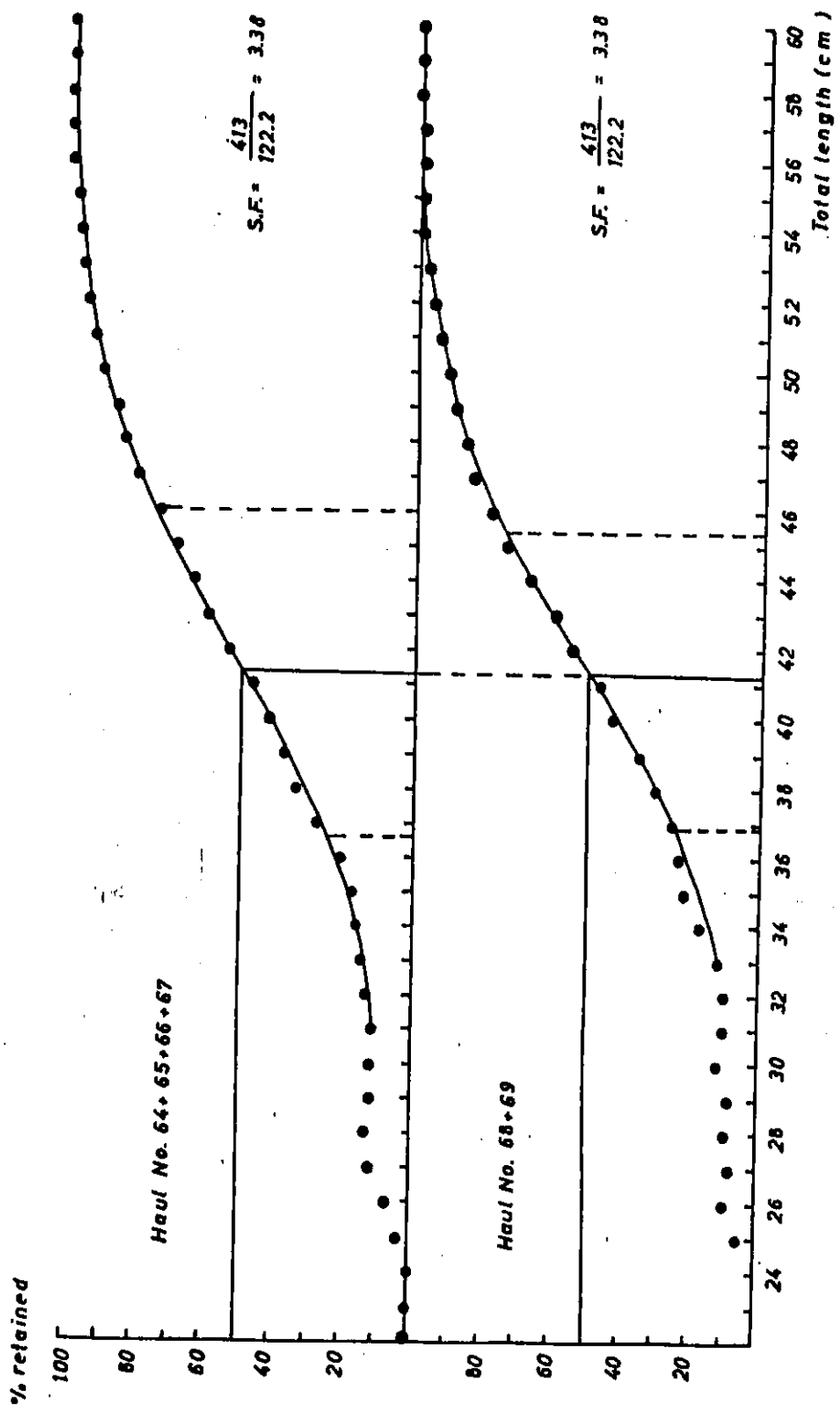

Fig. 2: Selection curves for combined hauls

Above: Without chafer; Below: With chafer

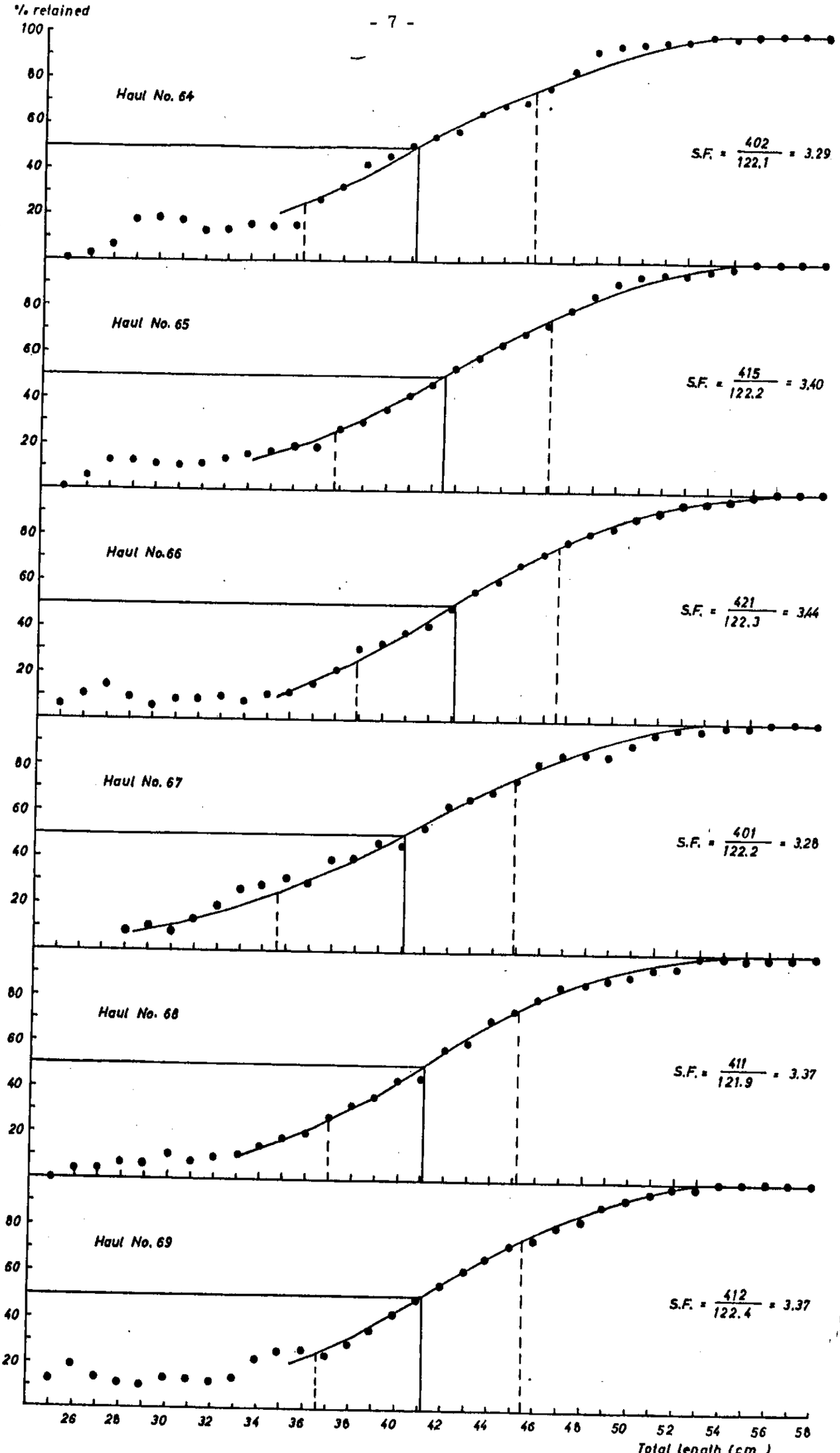

Fig. 3: Selection curves for individual hauls
Haul No. 64-67: Without chafer; Haul No. 68-69: With chafer