Northwest Atlantic Fisheries Organization

Serial No. N1161

NAFO SCR Doc. 86/45

SCIENTIFIC COUNCIL MEETING - JUNE 1986

Migrations of Spotted Wolffish (Anarhichas minor Olafsen) in West Greenland

by

Frank Riget

Greenland Fisheries and Environment Research Institute
Tagensvej 135, DK-2200, Copenhagen N, Denmark

Abstract

During the years 1955-1964 a total of 679 spotted wolffish were tagged with Petersen disc tags along the West Greenland coast. From these experiments 53 recaptures were reported showing generally short distance migrations but few long-distance migrations were seen. Tagging experiments in the Nuuk area are discussed with the results of some longline experiments to make probably the occurence of local seasonel movements.

Introduction

Spotted wolffish (Anarhichas minor) is the dominant wolffish species in inshore Greenlandic waters. It is fairly abundant along the coast from south to about 73°N and is found occasionally so far north as 77°.5 N.

The biology of spotted wolffish in West Greenland waters is not well known. It is generally assumed that adult wolffish exhibit a southern migration counteracting the northern movement of the larvae.

In this paper the migration pattern is deducted from tagging experiments, and on catch-per-effort data from research fishery in the Nuuk area. The results are discussed in relation to the general assumption of the biology and results of taggings experiments in Barents Sea and northern Norway (Østvedt, 1963) and in the Newfoundland area (Templeman, 1984).

Materials and methods

During 1955-64 a total of 679 spotted wolffish were tagged at several localities along the West Greenland coast from 61°N to 72°N. (Fig. 1). Tagging was carried out mainly in four areas : 1) Nuuk; 2) Maniitsoq and Sisimiut; 3) Disko Island and 4) Upernavik Kujalleq. Fish for tagging were obtained from long-line catches. The fish were tagged with Petersen discs. The fish had a range of 52 - 127 cm total length.

Catches from 268 longline sets (345.000 hooks) in the Nuuk area by Greenland Fisheries Investigation during 1955-79 have been analysed. For analysis the longline sets have been grouped according to the location (offshore, inshore and fiords) (Fig. 2). The depth range of the sets was 60 - 360 m.

Results

Recapture of tagged fish

Table 1 summarises data on the 53 recaptures reported. The location of a relativly large part (19%) of the recaptures is unknown or uncertain. Likewise the time of recapture of some fish is uncertain.

The time spent in the sea from time of tagging to the time of recapture varies from 1 day to 13 years. However 88% of the recaptures were caught more than half a year after tagging.

Most of the recaptures (67%) were taken within 10 n.miles of the tagging area (Table 1) . Only 5 fish migrated more than 60 n.miles, 3 in a southern, 1 in a northern and 1 in an eastern (inshore) direction. No clear relationship between distance migrated and the time spent at sea is seen (Fig.3).

From the tagging experiments in the Nuuk area, fish have been tagged mainly in the outer Godthåb Fiord (Fig.2). Of a total of 19 recaptures 8 were recaptured less than 10 n.miles from the tagging locality, 6 from 15 to 60 n.miles inshore in Godthåb Fiord, 4 from 15 to 20 n.miles south and west of Nuuk, and 1 was recaptured 110 n.miles north of Nuuk. The relatively many recaptures in an inshore direction could be interpreted as an occurrence of a local migration pattern.

Variation in catch-per-effort

From the tagging experiments it is not possible to detect any seasonal movement, therefore an analysis of longline experiments done in different months in the Nuuk area were performed. In the inshore area there is a marked peak in mean catch pr.100 hooks (CPUE) in June, and in the fiords a similar peak in July (Fig 4). In the offshore area there seems to be no difference in CPUE between the months of investigation.

Discussion

Hansen (1968) puts forward the theory that adult spotted wolffish lives chiefly in the southern part of West Greenland waters from where they propagate. Hansen further suggested that the larvae in the southern area seek the surface and then are carried by the current towards north where they settle at the bottom. When reaching maturity they migrate to the southern spawning grounds. This theory was based partly on differences in length distribution observed in fishing experiments along West Greenland (Fig.5 from Hansen, 1959) and partly on the occurence of wolffish larvae in the plankton.

The results in the present study are biased because fishing effort is not evenly distributed in the area. The fishery for the spotted wolf-

fish in the period has been mainly an inshore longline fishery close to cities and settlements and all recaptures were made from inshore or coastal localities.

However the migration pattern in this study does not give support to Hansen´s theory. The recaptures reported indicate that adult spotted wolffish may be considered mainly stationary, although examples of long distance migration are found. Only few fish had migrated in a southern direction.

Although the number of recaptures is small these results from West Greenland waters are similar to those reported by Østvedt (1963) from tagging experiments in the Barents Sea and Templeman (1984) from the Newfoundland area.

The tagging experiments in the outer Godthåb Fiord shows 6 recaptures in inshore direction out of a total of 19. The recaptures were taken between 8 and 121 months after tagging. These results could be taken as an indication of an inshore migration although the possibility of bias in distribution of fishing effort should be remembered.

The CPUE figures from longline experiments show peaks in June in the inshore area and in the fiords in July (Fig 3). This may be interpreted as a seasonel movement to the inner area in summer.

It is concluded that spotted wolffish are mainly stationary with only local seasonal movements, possibly related to spawning and feeding.

References

Hansen, P.M. 1959. Spotted Wolffish, Anarhichas minor. Ann. Biol. (1957) 14 : 40.

Hansen, P.M. 1968. Report on wolffish larvae in West Greenland waters. ICNAF Spec. Publ. No. 7. Environmental Surveys. NORWESTLANT 1-3, 1963 Part I : 183-185.

Templeman, W. 1984. Migrations of Wolffishes, Anarhichas sp., from Tagging in the Newfoundland Area. J. Northw. Atl. Fish. Sci., 5 : 93-97.

Østvedt, O. J. 1963. On the life history of the spotted catfish (Anarhichas minor Olafsen). Fiskeridirektoratets skrifter, Serie Havundersøgelser 13(6) : 54-72.

Table 1. Time spent in sea from time of tagging to time of recapture and distance as well as direction between location of tagging and location of recapture.

Time year	Distance n.miles	Direction	Tagging locality	Length at tagging cm
6.2	420	south	Sisimiut	68
13.0	120	south	Upernavik Kujaleq	66
2.9	110	north	Nuuk	110
1.3	70	south	South of Sisimiut	94
1.3	60	inshore	Nuuk	104
1.9	20	inshore	Nuuk	92
0.8	20	south	Nuuk	108
1.8	20	south	Nuuk	93
10.1	20	inshore	Nuuk	105
1.9	20	inshore	Nuuk	86
0.8	15	inshore	Nuuk	99
1.8	15	south	Nuuk	109
0.8	15	inshore	Nuuk	97
2.1	15	south	Disko	84
1.1	<10		Nuuk	127
0.8	<10		Nuuk	111
1.4	<10		Nuuk	103
0.8	<10		Nuuk	93
6.8	<10		Nuuk	101
4.8	<10		Nuuk	93
5.7	<10		Nuuk	97
6.5	<10		Nuuk	74
0.3	<10		Nuuk	91
0.5	<10		Marmoralik	64
1.4	<10		Maniitsoq	71
2.6	<10		Upernavik Kujaleq	52
0.7	<10		Upernavik Kujaleq	79
1 day	<10		Upernavik Kujaleq	76
1-9 days	<10		Upernavik Kujaleq	71
2 ?	<10		Disko	70
1.0	<10		Disko	67
1.1	<10		Disko	95
23 days	<10		Disko	73
17 days	<10		Disko	76
28 days	<10		Paamiut	113
1.5	<10		Maniitsoq	93
1.7	<10*		Upernavik Kujaleq	68
1.7	<10*		Upernavik Kujaleq	62
1.6	<10*		Upernavik Kujaleq	53
2.0	<10*		Upernavik Kujaleq	67
3.9	<10*		Disko	78
4.0	?		Sisimiut	81
4.0 ?	?		West of Sisimiut	83
3.7	?		South of Sisimiut	86
3.0 ?	?		South of Sisimiut	85
6.0	?		Disko	107
6.4	?		Nuuk	102
2.2	?		Nuuk	101
1.3	?		Nuuk	82
5.9	?		Nuuk	74
2.9	?		Nuuk	97
0.8	?		Nuuk	70
1.9	?		Nuuk	76

*Distance probably less than 10 n.miles.

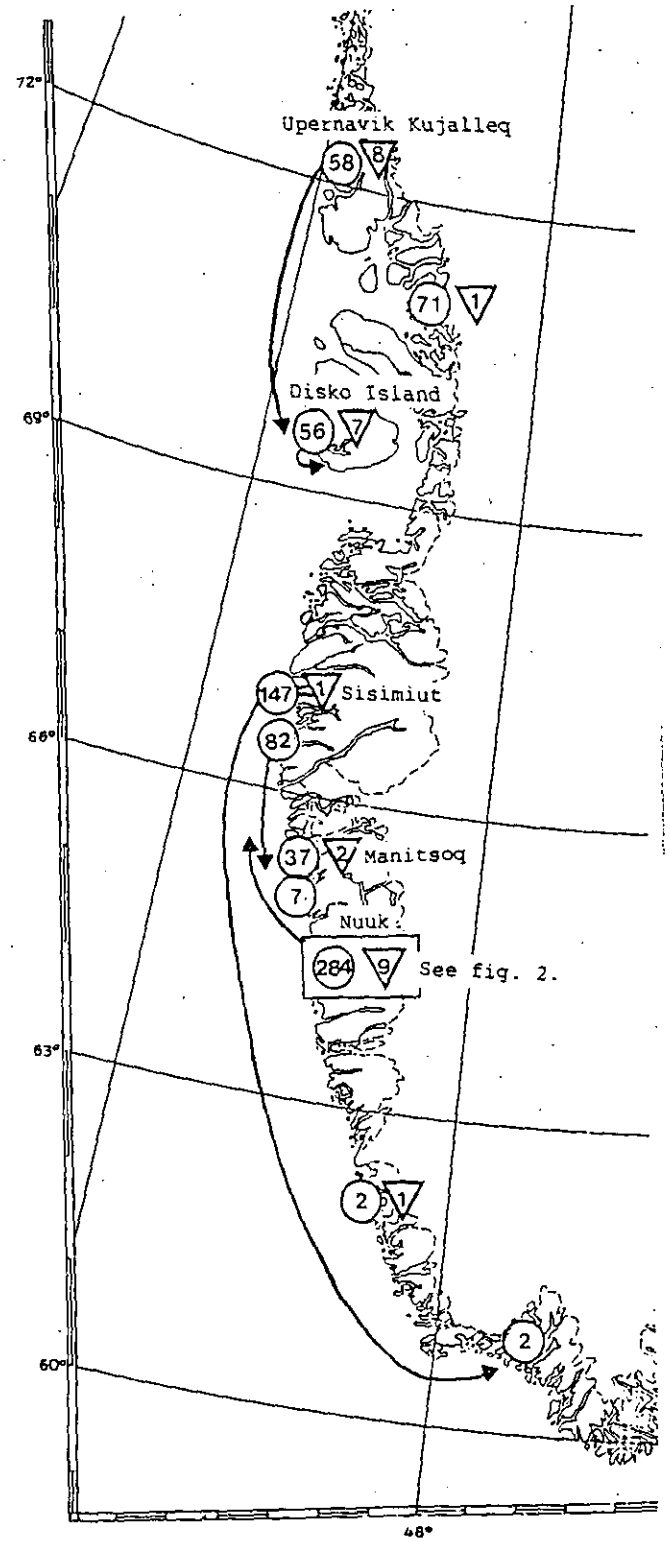


Fig 1 : Migrations of spotted wolffish. (Circles are tagging sites with numbers of fish tagged, triangles with numbers represent fish recaptured < 10 n.miles from tagging locality and tips of arrows are location of recapture).

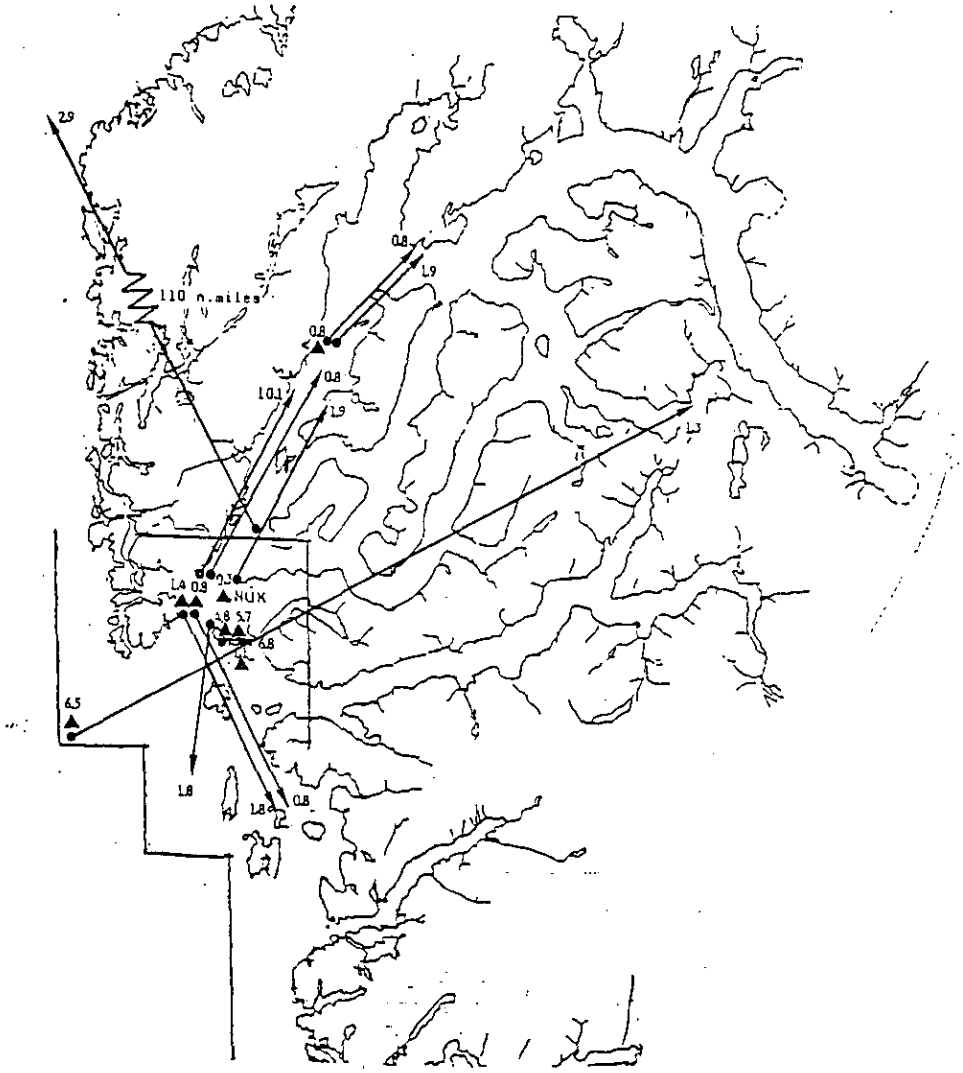


Fig 2 : Migrations of spotted wolffish in the Nuuk area. (Triangles represent fish recaptured < 10 n.miles from tagging lacality, arrows are locality of recaptures and numbers are years between tagging and recapture).

Line represent the division of the area in offshore, inshore and fiords for the analysis of catch data.

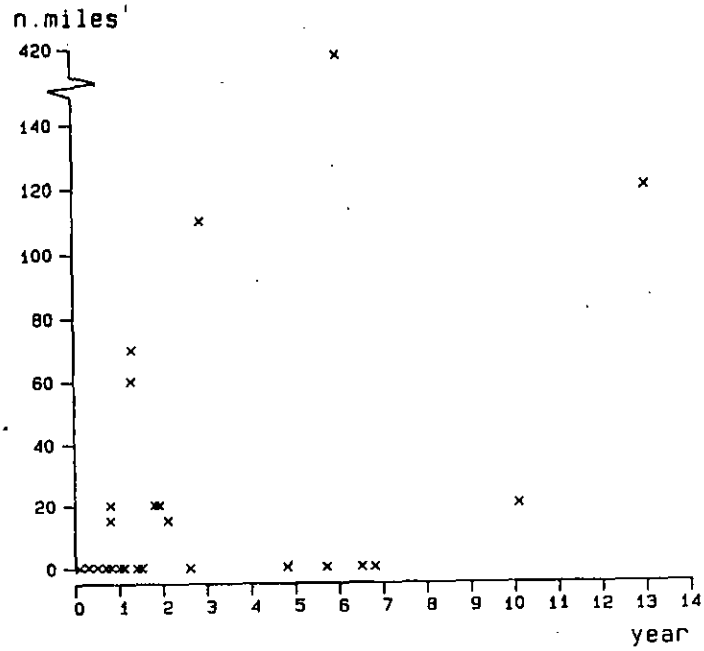
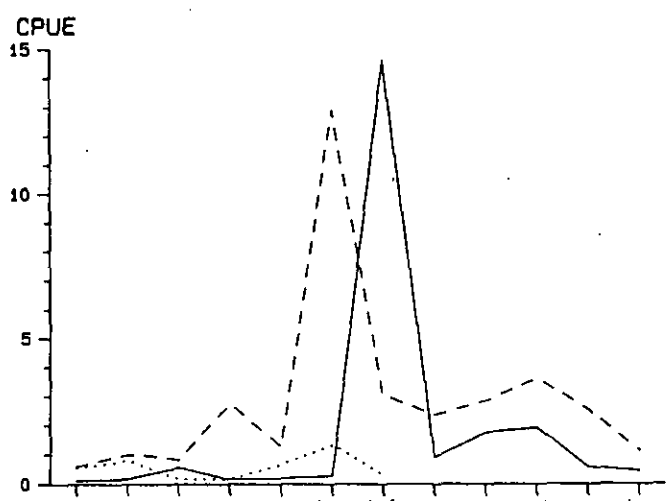


Fig 3 : Relationship between migration distance and time at sea of individual fish.



1	2	7	4	5	10	8	1					number of sets in offshore area
11	10	9	9	3	4	2	12	8	17	18	10	number of sets in inshore area
9	8	15	20	7	5	3	5	8	6	5	15	number of sets in fiords

Fig 4 : Relationship between mean CPUE and time of the year in the Nuuk area.

offshore area .....
inshore area - - -
fiords ———

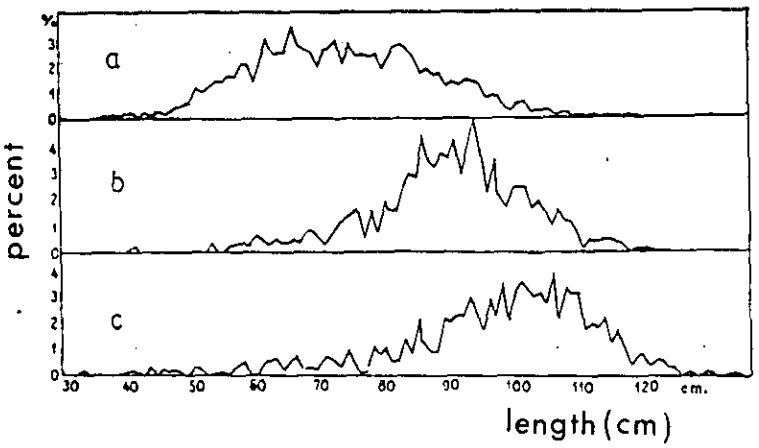


Fig 5 : Length frequencies of spotted wolffish from three regions A, Div. 1A north (72 08 N); B, Div 1A south 69 28 N); C, Div 1B-1C. (from Hansen, 1959)