

TABLE 1: AVAILABLE DATA

COMMON NAME:	HADDOCK	SPECIES:	MELANOGRAMMUS AEGLEFINUS
AREA:	NORTH SEA	STOCK:	ICES AREA IV
CREATED BY:	PETER WRIGHT	UPDATED BY:	

Data status									
Year	Stock size	Stock composition	Age	Sex ratio	Maturity	Fecundity	Weight	Condition	Additional data
2001									
2000	√	√	√	√					
1999	√	√	√	√	√	√	√	√	√
1998	√	√	√	√	√				
1997	√	√	√	√	√				
1996	√	√	√	√	√	√	√	√	√
1995	√	√	√	√	√	√	√	√	√
1994	√	√	√	√	√	√	√	√	√
1993	√	√	√	√	√				
1992	√	√	√	√	√				
1991	√	√	√	√	√				
1990	√	√	√	√	√				
1989	√	√	√	√	√				
1988	√	√	√	√	√				
1987	√	√	√	√	√				
1986	√	√	√	√	√				
1985	√	√	√	√	√				
1984	√	√	√	√	√				
1983	√	√	√	√	√				
1982	√	√	√	√	√				
1981	√	√	√	√	√				
1980	√	√	√	√	√				
1979	√	√	√		√				

Data status									
Year	Stock size	Stock composition	Age	Sex ratio	Maturity	Fecundity	Weight	Condition	Additional data
1978	√	√	√		√				
1977	√	√	√		√				
1976	√	√	√		√	√			
1975	√	√	√		√	√			
1974	√	√	√		√				
1973	√	√	√		√				
1972	√	√	√		√				
1971	√	√	√		√				
1970	√	√	√		√				
1969	√	√	√		√				
1968	√	√	√		√				
1967	√	√	√		√				
1966	√	√	√		√				
1965	√	√	√						
1964	√	√	√						
1963	√	√	√						
1962									
1961									
1960									
1932						√			
1920-63	√	√							

TABLE 2: DATA BASIS, FORMAT AND QUALITY

COMMON NAME:	HADDOCK		
AREA:	NORTH SEA		
STOCK:	ICES AREA IV		
REPRODUCTIVE STRATEGY:	DETERMINATE BATCH SPAWNER	REF. NO.:	15, 18
TIMING OF SPAWNING:	FEBRUARY -MAY	REF. NO.:	14-19
OPTIMAL TIME FOR MATURITY SAMPLING:	DECEMBER-FEBRUARY	REF. NO.:	6

Data basis, format and quality						
Parameters	Year range	Data basis (A/L/W)	Data origin	Sampling frequency	Notes on data, methods and contents	Ref. No.
Stock size	1920-63	A	CL	M	VPA but high uncertainty in estimates	2
	1963 –2000	A	CL, CC in some areas after 1990	M	Catch at age analysis (VPA)	1
Stock composition	1963 –2000	L, A	CL	M	Catch at age analysis (VPA)	1
	1970s, 1988-90	L,A, W	CL,CC		No routine weight measurements	8
Age determination	1963 –2000	otoliths	C,L	M	age based assessments	1
Sex ratio	1963-2000	L, A	S	A	Surveys	10
Maturity:						
A. Ogives	1966-1976	A,L,	S		dedicated study	3
		A,L,			dedicated study	4
	1977-80	A,L, W			dedicated study	5
	1980-1997	A,L				23
B. Skip of spawning						
C. Spawning probability						
D. Other						
Fecundity:						
A. Estimation	1920s	A,L	S	A		7
	1969-7	A,L				3
	1977 -80	A,L,W				5

Data basis, format and quality						
Parameters	Year range	Data basis (A/L/W)	Data origin	Sampling frequency	Notes on data, methods and contents	Ref. No.
B. First time vs. repeat spawners						
C. Atresia						
D. Other						
Weight:						
A. Commercial fisheries data	1970s 1988-90		CC		no regular sampling	8
B. Survey data			S			
C. Other						
Condition:						
A. Fulton						
B. HSI	1969-70		CC, S	M		8
C. Energy						
D. Other						
Egg viability:						
A. Egg quality	1978-1986 1978-1986	A,L,W	S	A		11 12
B. Fertilisation success						
C. Egg mortality						
D. Other	1992		S		egg distribution survey	13
Larval viability:						
A. Hatching success						
B. Larvae quality						
C. Mortality						
D. Other						
Spawning time	1950s 1971-73		S	A	plankton surveys	14
					experiments	15
					review	16
					review	17
					review	18
					experiments	19
Contamination						
Environmental key factors	1970s		S	dedicated	regional trophic studies	20
Other factors or parameters						

TABLE 3: STUDIES OF REPRODUCTIVE POTENTIAL

COMMON NAME:	HADDOCK
AREA:	NORTH SEA
STOCK:	ICES AREA IV

Estimation of reproductive potential			
Subject	Short description	Year range	Ref. No.
Potential or realised egg production			
Viable egg and larvae production			
Critical life stages	REVIEW OF GADOID STOCK CHANGES	1962-1993	21
Environmental influences			
Stock recruitment relations	REVIEW OF GADOID STOCK CHANGES	1922-1993	21, 22
Other studies			

TABLE 4: DATA SOURCES

COMMON NAME:	HADDOCK
AREA:	NORTH SEA
STOCK:	ICES IV

Data sources (literature reference or contact person)
1. ICES. MS 2001. Report of the ICES Advisory Committee on Fishery Management, 2000. <i>ICES Coop. Res. Report</i> , No. 242, 361-366.
2. POPE, J. G. and C. T. MACER. 1996. An evaluation of the stock structure of North Sea cod, haddock and whiting since 1920, together with a consideration of the impact of fisheries and predation effects on their biomass and recruitment. <i>ICES J. Mar. Sci.</i> , 53 : 1157-1169.
3. ALEKSEYEVA, Y. I. AND I. D. TORMOSOVA. 1979. Maturation, Spawning and Fecundity of the North Sea Haddock, <i>Melanogrammus aeglefinus</i> . <i>J. Ichthyol.</i> , 19 : 56-64.
4. TORMOSOVA, I. D. 1983. Variation in the age at maturity of the North Sea haddock, <i>Melanogrammus aeglefinus</i> (Gadidae). <i>J. Ichthyol.</i> , 23 : 68-74.
5. HISLOP, J. R. G. and A. M. SHANKS. 1981. Recent Investigations on the Reproductive Biology of the Haddock, <i>Melanogrammus aeglefinus</i> , of the Northern North Sea and the Effects on Fecundity of Infection With the Copepod Parasite <i>Lernaeocera branchialis</i> . <i>J. Cons. Int. Explor. Mer.</i> , 39 : 244-251.
6. ROBB, A. P. 1982. Histological Observations on the Reproductive Biology of the Haddock, <i>Melanogrammus aeglefinus</i> (L.). <i>J. Fish Biol.</i> , 20 : 397-408.
7. RAITT, D. S. MS 1932. The fecundity of the haddock. <i>Fisheries Board of Scotland, Scientific Investigations</i> , 1 , 40 p.
8. UNPUBL. DATA. FRS Marine Laboratory, Aberdeen, Scotland.
9. UNPUBL. DATA. CEFAS Fishery laboratory, Lowestoft, England and other institutes.
10. UNPUBL. DATA. ICES International bottom trawl surveys, H. Sparholt, ICES headquarters.
11. HISLOP, J. R. G. 1988. The influence of maternal length and age on the size and weight of the eggs and the relative fecundity of the haddock, <i>Melanogrammus aeglefinus</i> , in British waters. <i>J. Fish Biol.</i> , 32 : 923-930.
12. HISLOP, J. R. G. and M. A. BELL. 1987. Observations on the size, dry weight and energy content of the eggs of some demersal fish species from British marine waters. <i>J. Fish Biol.</i> , 31 : 1-20.
13. HEATH, M. and P. RANKINE. 1994. Distribution of cod and haddock eggs in the North Sea in 1992 in relation to oceanographic features and compared with distributions in 1952-1957. <i>ICES Mar. Sci. Symp.</i> , 198 : 438-439
14. SAVILLE, A. 1959. The planktonic stages of the haddock in Scottish waters. <i>Marine Research</i> , 3 : 3-23.
15. HISLOP, J. R. G., A. P. ROBB, and J. A. GAULD. 1978. Observations on effects of feeding level on growth and reproduction in haddock, <i>Melanogrammus aeglefinus</i> (L.) in captivity. <i>J. Fish Biol.</i> , 13 : 85-98
16. HISLOP, J. R. G. 1984. A comparison of the reproductive tactics and strategies of cod, haddock, whiting, and Norway Pout in the North Sea. In: <i>Fish Reproduction Strategies and Tactics</i> , G. W. Potts and R. J. Wootton (eds.), Academic Press, London, p. 311-329.

Data sources (literature reference or contact person)
17. BRANDER, K. 1993. Comparison of spawning characteristics of cod (<i>Gadus morhua</i>) stocks in the North Atlantic. <i>NAFO Sci. Coun. Studies</i> , 18 : 13-20.
18. MOKSNESS, E. and J. RIIS VESTERGAARD. MS 1983. Spawning of haddock (<i>Melanogrammus aeglefinus</i>) in captivity. <i>ICES CM Doc.</i> , No. G:30
19. MOKSNESS, E. MS 1983. Spawning of haddock (<i>Melanogrammus aeglefinus</i> L.) in captivity new experiments in 1983. <i>ICES CM Doc.</i> , No. G:24.
20. ECONOMOU, A. N. 1991. Food and feeding ecology of five gadoid larvae in the northern North Sea. <i>J. Cons. Ciem.</i> , 47 : 339-351.
21. ICES. MS 2001. Workshop on Gadoid stocks in the North sea during the 1960s and 1970s. The Fourth ICES/GLOBEC backward facing workshop. <i>ICES Co-op. Res. Report</i> , No. 244, 55 p.
22. SAHRHAGE, B. and G. WAGNER. 1978. On fluctuations in the haddock population of the North Sea. <i>ICES Rapp. Proc.-Verb.</i> , 172 : 72-85.
24. WRIGHT, P., I. GIBB, G. STRUGNELL, and A. DRYSDALE. Estimating egg production in North Sea haddock (in prep.)

