

REGISTRO

A Direção do Laboratório de Ciências do Mar da Universidade Federal do Ceará, com o presente registro, exprime o seu júbilo pelo transcurso do 10.^o aniversário de criação do órgão.

Criado pela Resolução n.^o 96, de 2 de dezembro de 1960, como Estação de Biologia Marinha da Universidade do Ceará, na categoria de Instituto Aplicado, mudou, por força da Reforma Universitária implantada em 1969, de denominação e de *status*, passando a Laboratório de Ciências do Mar da Universidade Federal do Ceará, na categoria de Órgão Suplementar.

Ao fazer este registro, a Direção do Laboratório de Ciências do Mar experimenta prazer em poder expressar a sua gratidão àqueles todos que contribuíram para a sua criação e que deram o seu decidido apoio ao seu funcionamento. De modo especial este agradecimento é dirigido ao Reitor Antônio Martins Filho, criador do órgão e que não lhe regateou apoio; ao Dr. Rui Simões de Menezes, autor da idéia de sua criação; ao saudoso Professor Raimundo Renato de Almeida Braga e ao Dr. Prisco Bezerra, aliados da primeira hora e grandes incentivadores; ao Professor Raimundo Walnir Chagas, autor dos instrumentos que permitiram a sua institucionalização; ao Reitor Fernando Leite, pelo apoio emprestado durante o seu mandato.

Por fim, a Direção do Laboratório de Ciências do Mar resta satisfeita por constatar, sem falsa modéstia, que o órgão, nos seus primeiros dez anos de funcionamento, justificou, de maneira plena, a sua criação e a sua existência.

REGISTER

The Director of the Laboratório de Ciências do Mar da Universidade Federal do Ceará through this register expresses his satisfaction for the tenth anniversary of the foundation of this Institution.

Created by Resolution n.^o 96, of December 2, 1960, under the name of Estação de Biologia Marinha da Universidade do Ceará, in the grade of an Applied Institute, changed, according to the terms of University Reform of 1969, of denomination and *status*, becoming Laboratório de Ciências do Mar da Universidade Federal do Ceará, with the grade of a Supplementary Organ.

With this register the Director of the Laboratório de Ciências do Mar has the pleasure of expressing his gratitude to all those that contributed to its foundation, and that gave their effective support to its functioning.

In special, this gratitude is directed to Rector Antônio Martins Filho, founder of the Organ, to which he presented all his support; to Rui Simões de Menezes, author of the idea of its foundation; to the late Prof. Raimundo Renato de Almeida Braga and to Doctor Prisco Bezerra, allied from the beginning and great incentives; to Prof. Raimundo Walnir Chagas, author of the legal procedures that permitted its officialization; to the Rector Fernando Leite, for the support given during his mandate.

Finally, the Director of the Laboratório de Ciências do Mar is satisfied to verify, without false modesty, that the organ in its first ten years of functioning, totally justified its creation and existence.

INVESTIGATIONS ON THE WHALING SEASONS 1964 - 1967 , OFF NORTHEASTERN COAST OF BRAZIL

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Whaling off northeastern coast of Brazil is seasonal, and comprises tropical waters of Western South Atlantic (Whaling area A S W).

The only whaling enterprise in this Brazilian area is based at Costinha (latitude 6°57'45"S — longitude 34°51'28"W), on the left shore of the mouth of Paraíba do Norte River (State of Paraíba).

In continuation to our investigations on whaling in northeastern Brazil (Paiva & Grangeiro, 1965), the seasons 1964-1967 are here analysed.

In spite that all known species of the families Balaenopteridae and Physeteridae are represented in Brazil, only the species *Balaenoptera borealis* (Lesson), *Balaenoptera acutorostrata* Lacépède, *Balaenoptera musculus* (Linnaeus), *Megaptera novaeangliae* (Borowski) and *Physeter catodon* Linnaeus were caught during the 1964-1967 whaling seasons off northeastern Brazil. Common names of these species, in English and Portuguese, are listed in table I.

In the Brazilian northeastern, whaling seasons coincide with the occurrence of the herds in the area studied, the whaler(s) making daily trips to the fishing grounds (Grangeiro, 1962).

General data on whaling seasons 1964-1967, off the northeastern coast of Brazil, are found in tables II and III.

Acknowledgments: The authors are most grateful to "Companhia de Pesca Norte do Brasil", for the data analysed in this paper.

OBSERVATIONS ON SEI WHALE

This species was always predominant in the whale catches off northeastern Brazil (Paiva, 1961; Paiva & Grangeiro, 1965). However, this was not true for the 1966-1967 seasons, when it was in second place, while the minke whale was foremost (table IV).

In the 1964-1967 seasons, the participation of the sei whale in the total catches was progressively decreasing, with a maximum of

TABLE I

Common and scientific names of whales caught off Northeastern coast of Brazil, during the whaling seasons 1964-1967.

Common names		Scientific names
English	Portuguese	
sei whale	baleia espadarte	<i>Balaenoptera borealis</i> (Lesson)
minke whale	baleia mirim	<i>Balaenoptera acutorostrata</i> Lacépède
blue whale	baleia azul	<i>Balaenoptera musculus</i> (Linnaeus)
humpback whale	baleia preta	<i>Megaptera novaeangliae</i> (Borowski)
sperm whale	cachalote	<i>Physeter catodon</i> Linnaeus

T A B L E I I

Data concerning the whaling seasons 1964-1967, off Northeastern coast of Brazil.

Years	Whaling seasons		Whalers in operation	Daily whaler voyages			Whales		Percentage of the catches	Catch per voyage
	beginning	ending		total	no catch	with catch	seen	caught		
1964	June, 18th	October, 23rd	1	127	13	114	613	304	49.6	2.39
1965	June, 14th	October, 18th	1	123	24	99	535	229	42.8	1.86
1966	June, 7th	November, 28th	1	161	26	135	1,071	448	41.8	2.78
1967	June, 14th	November, 25th	1	164	19	145	1,315	563	42.8	3.43

Remark: the whaler Daishin Maru 1 operated in the seasons 1964-1965 and the whaler Koyo Maru in the seasons 1966 - 1967.

84.2% in 1964, and a minimum of 9.7% in 1967 (table IV), not reaching values of over 90.0%, like the ones registered in the 1960-1963 seasons (Paiva & Grangeiro, 1965).

The same fact was observed, in connection with the killings of the species, given in blue whale units (B.W.U.), with a maximum of 42.7 in 1964, and a minimum of 9.2 in 1967 (table IV). In the 1960-1963 seasons, the B.W.U. values corresponding to this species, were also decreasing, with a maximum of 83.3 in 1960, and a minimum of 42.2 in 1963 (Paiva & Grangeiro, 1965).

Sei whale killings per trip were decreasing in number of individuals, as well as in B.W.U., with a maximum in 1964 (2.01 whales and 0.34 B.W.U.), and a minimum in 1967 (0.33 whales and 0.05 B.W.U.), as per data on table IV. In the 1960-1963 seasons, such values were always superior in whale numbers, and at least, equal to the maximum B.W.U. registered in 1964 (Paiva & Grangeiro, 1965).

The data in discussion suggest a progressive sei whale population reduction off northeastern Brazil.

For each whaling season in study, there was a predominance of males over females, in the killings of sei whale (table V). The same fact was also verified in the 1960-1963 seasons (Paiva & Grangeiro, 1965). The data available do not permit to draw the sex-ratio in the stock of this species, for the killings were selective, due to prohibition of hunting females accompanied by their calves. However, in the killings effected, the sex-ratio was 1.7:1.0 in 1964, 1.5:1.0 in 1965, 1.1:1.0 in 1966, and 1.3:1.0 in 1967.

In general, during the months from July to September, when higher sei whale captures were registered, males predominated over females; although it is not possible to conclude that males reach the whaling grounds before females it is likely that they leave them first, returning to their origin waters (table V). Similar observations were also made for the 1960-1963 seasons (Paiva & Grangeiro, 1965). By November, the sei whale is no longer present off the Brazilian northeastern (table V).

Sei whale catch per whaler trip during the 1964-1967 season months (table VI), suggests a higher relative abundance during the months from July to September. The same is also indicated by the 1960-1963 seasons (Paiva & Grangeiro, 1965).

Average length⁽¹⁾ data on sei whales captured in the 1964-1967 seasons, are presented in table VII.

Mean lengths of sei whale females were always larger than that of males, during all seasons analysed. This fact was also registered

TABLE III

Monthly data concerning the whaling seasons 1964-1967, off Northeastern coast of Brazil.

Years	Months	Daily whaler voyages			Whales		Percentage of the catches	Catch per voyage
		total	no catch	with catch	seen	caught		
1964	June	13	3	10	48	24	50.0	1.85
	July	31	2	29	179	82	45.8	2.65
	August	31	2	29	139	66	47.5	2.13
	September	29	2	27	146	67	45.9	2.31
	October	23	4	19	101	65	64.4	2.83
1965	June	17	7	10	58	19	32.8	1.12
	July	31	11	20	109	36	33.0	1.16
	August	30	2	28	151	68	45.0	2.27
	September	28	2	26	163	74	45.4	2.64
	October	17	2	15	54	32	59.3	1.88
1966	June	16	9	7	57	13	22.8	0.81
	July	31	4	27	155	55	35.5	1.77
	August	31	9	22	139	45	32.3	1.45
	September	30	0	30	266	110	41.4	3.67
	October	31	1	30	290	146	50.3	4.71
	November	22	3	19	164	79	48.2	3.59
1967	June	17	9	8	29	14	48.3	0.82
	July	31	7	24	116	50	43.1	1.61
	August	31	2	29	180	88	48.9	2.84
	September	30	1	29	274	129	47.1	4.30
	October	31	0	31	436	166	38.1	5.35
	November	24	0	24	280	116	41.4	4.83

TABLE IV

Data concerning the species caught in the whaling seasons 1964-1967, off Northeastern coast of Brazil.

Years	Species	Catches by seasons			Catch per voyage	
		n	%	B.W.U.	n	B.W.U.
1964	sei whale	256	84.2	42.7	2.01	0.34
	minke whale	44	14.5	17.6	0.35	0.14
	sperm whale	4	1.3	2.0	0.03	0.02
Total of the season		304	100.0	62.3	2.39	0.50
1965	sei whale	143	62.5	23.8	1.16	0.19
	minke whale	71	31.0	28.4	0.58	0.23
	blue whale	1	0.4	1.0	0.01	0.01
	sperm whale	14	6.1	7.0	0.11	0.06
Total of the season		229	100.0	60.2	1.86	0.49
1966	sei whale	73	16.3	12.2	0.45	0.08
	minke whale	351	78.3	140.4	2.18	0.87
	sperm whale	24	5.4	12.0	0.15	0.07
Total of the season		448	100.0	164.6	2.78	1.02
1967	sei whale	55	9.7	9.2	0.33	0.05
	minke whale	475	84.4	190.0	2.90	1.16
	humpback whale	13	2.3	5.2	0.08	0.03
	sperm whale	20	3.6	10.0	0.12	0.06
Total of the season		563	100.0	214.4	3.43	1.30

(1) — The length measure considered in this paper was taken in the plane of symmetry, from the tip of the head to the fork of the caudal fin.

(2) — Sea areas codification, effected in agreement with FAO (1968), for 10 minutes side squares. Let us take, for instance, position 60°05'S — 34°13'W, and see its codification in the 10 minutes side square:

elements	code
10 minutes side square	1
southwest quadrant	3
latitude 6°05'S	6/00
longitude 34°13'W	34/10

The square corresponding to the position exemplified is the following: 1.3.6/00.34/10.

T A B L E V
Monthly data concerning the species caught by sexes, in the whaling season 1964-1967, off Northeastern coast of Brazil.

Years	Months	Number of whales caught	Sei whale				Minke whale				Blue whale				Humpback whale				Sperm whale			
			males		females		males		females		males		females		males		females		males		females	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1964	June	24	12	50.0	11	45.8	—	—	—	—	—	—	—	—	—	—	—	—	1	4.2	—	—
	July	82	64	78.0	18	22.0	—	—	—	—	—	—	—	—	—	—	—	—	1	1.5	—	—
	August	66	36	54.6	25	37.9	1	1.5	3	4.5	—	—	—	—	—	—	—	2	3.0	—	—	
	September	67	35	52.2	25	37.3	4	6.9	1	1.5	—	—	—	—	—	—	—	—	—	—	—	—
	October	65	15	23.1	15	23.1	11	16.9	24	36.9	—	—	—	—	—	—	—	—	—	—	—	—
	Total	304	162	53.3	94	30.9	16	5.3	28	9.2	—	—	—	—	—	—	—	4	1.3	—	—	
1965	June	19	7	36.8	9	47.4	—	—	1	5.3	—	—	—	—	—	—	—	—	—	—	—	—
	July	36	20	55.5	8	22.2	3	8.3	2	5.6	—	—	—	—	—	—	—	—	—	—	—	—
	August	68	33	48.5	20	29.4	4	5.9	8	11.8	—	—	—	—	—	—	—	—	—	—	—	—
	September	74	24	32.4	18	24.3	17	23.0	11	14.9	1	1.3	—	—	—	—	—	—	—	—	—	—
	October	32	1	3.1	3	9.4	6	18.8	19	59.4	—	—	—	—	—	—	—	—	1	3.1	—	—
	Total	229	85	37.1	58	25.3	30	13.1	41	17.9	1	0.4	—	—	—	—	—	—	4	1.8	—	—
1966	June	13	1	7.7	4	30.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	July	55	15	27.3	8	14.5	13	23.6	12	21.8	—	—	—	—	—	—	—	—	1	7.7	6	46.1
	August	45	10	22.2	6	13.3	11	24.5	17	37.8	—	—	—	—	—	—	—	—	4	7.3	3	5.5
	September	110	10	9.1	11	10.0	25	22.7	64	58.2	—	—	—	—	—	—	—	—	1	2.2	—	—
	October	146	3	2.1	5	3.4	33	22.6	98	67.1	—	—	—	—	—	—	—	—	1	0.7	6	4.1
	November	79	—	—	—	—	25	31.7	52	65.8	—	—	—	—	—	—	—	—	—	—	2	2.5
	Total	448	39	8.7	34	7.6	108	24.1	243	54.2	—	—	—	—	—	—	—	—	7	1.6	17	3.8
1967	June	14	5	35.7	4	28.6	—	—	3	21.4	—	—	—	—	—	—	—	—	—	—	—	—
	July	50	7	14.0	4	8.0	14	28.0	22	44.0	—	—	—	—	—	—	—	—	—	—	—	—
	August	88	11	12.5	4	4.5	21	23.9	39	44.3	—	—	—	—	—	—	—	—	—	—	—	—
	September	129	7	5.4	8	6.2	27	20.9	83	64.3	—	—	—	—	—	—	—	—	—	—	—	—
	October	166	1	0.6	4	2.4	46	27.7	113	68.1	—	—	—	—	—	—	—	—	—	—	—	—
	November	116	—	—	—	—	40	34.5	67	57.7	—	—	—	—	—	—	—	—	—	—	—	—
	Total	563	31	5.5	24	4.3	148	26.3	327	58.0	8	1.4	—	—	—	—	—	—	10	1.8	5	0.9

Remark: no male of blue whale was caught in the whaling seasons 1964-1967.

T A B L E V I

Monthly data concerning the catch per voyage by species, in the whaling seasons 1964-1967, off Northeastern coast of Brazil.

Years	Months	Sei whale	Minke whale	Blue whale	Humpback whale	Sperm whale	Total
1964	June	1.77	—	—	—	0.08	1.85
	July	2.65	—	—	—	—	2.65
	August	1.97	0.13	—	—	0.03	2.13
	September	2.07	0.17	—	—	0.07	2.31
	October	1.31	1.52	—	—	—	2.83
1965	June	0.94	0.06	—	—	0.12	1.12
	July	0.90	0.16	—	—	0.10	1.16
	August	1.77	0.40	—	—	0.10	2.27
	September	1.50	1.00	0.03	—	0.11	2.64
	October	0.23	1.47	—	—	0.18	1.88
1966	June	0.31	0.06	—	—	0.44	0.81
	July	0.74	0.81	—	—	0.22	1.77
	August	0.52	0.90	—	—	0.03	1.45
	September	0.70	2.97	—	—	—	3.67
	October	0.26	4.22	—	—	0.23	4.71
	November	—	3.50	—	—	0.09	3.59
1967	June	0.53	0.17	—	—	0.12	0.82
	July	0.35	1.16	—	0.03	0.07	1.61
	August	0.48	1.94	—	0.26	0.16	2.84
	September	0.46	3.70	—	0.07	0.07	4.30
	October	0.16	5.13	—	0.06	—	5.35
	November	—	4.46	—	—	0.37	4.83

for the 1960-1963 seasons (Paiva & Grangeiro, 1965).

In general, the mean lengths of males and females killed in the 1964-1967 seasons were inferior to those recorded for the 1960-1963 seasons (Paiva & Grangeiro, 1965), the same happening when both sexes are together analysed.

Mean length distribution of sei whales by sexes in the 1964-1967 season months shows no definite tendency, as already observed in the 1960-1963 seasons (Paiva & Grangeiro, 1965).

The distribution of sei whale killings by sea areas ⁽²⁾, during the 1964-1967 seasons (tables X to XIII), does not show any tendency, being of an aleatory nature. In the analysed whaling seasons, sei whale killing grounds were comprised between the following latitudes and longitudes: in 1964 — from 6°00' to 7°20'S, and from 34°00' to 34°40'W; in 1965 — from 6°30' to 7°30'S, and from 34°00' to 34°50'W; in 1966 — from 6°10' to 7°40'S, and from 33°20' to 34°40'W; in 1967 — from 6°30' to 8°10'S, and from 33°40' to 34°50'W.

OBSERVATIONS ON MINKE WHALE

In the 1966-1967 seasons, this species became predominant in the whale captures off northeastern Brazil (table IV), taking the foremost place previously occupied by the sei whale. In the 1960-1963 seasons, the minke

whale was seldom captured (Paiva & Grangeiro, 1965).

From the 1964 season onward, the participation of this species in the whale killings was progressively increasing, with a minimum of 14.5% in 1964 and a maximum of 84.4% in 1967; the same fact was observed in connection with the killings given in B.W.U., with a minimum of 17.6 in 1964, and a maximum of 190.0 in 1967 (table IV). In the 1960-1963 seasons, the highest killings of this species occurred in 1960, when it represented 2.1% of the captures, and 4.4 B.W.U. (Paiva & Grangeiro, 1965).

Minke whale killings per whaler trip were increasing in number of individuals, as well as in B.W.U., with a minimum in 1964 (0.35 whales and 0.14 B.W.U.) and a maximum in 1967 (2.90 whales and 1.16 B.W.U.), as per data on table IV. Such values are extremely superior to the ones observed in the 1960-1963 seasons (Paiva & Grangeiro, 1965).

In each whaling season now analysed, females predominated over males in the killings of minke whales (table V). In these killings, the sex-ratio was 0.6:1.0 in 1964, 0.7:1.0 in 1965, 0.4:1.0 in 1966, and 0.5:1.0 in 1967, thus suggesting a higher minke whale females abundance off northeastern Brazil.

Minke whale captures per whaler trip in 1964-1967 season months (table VI) were increasing, at least until October, suggesting a

T A B L E V I I
 Mean lengths (m) of sei whales caught off Northeastern coast of Brazil, during the whaling seasons 1964-1967.

Months	Sexes	Whaling seasons							
		1964		1965		1966		1967	
		whales (n)	arithmetical means (\bar{x})	whales (n)	arithmetical means (\bar{x})	whales (n)	arithmetical means (\bar{x})	whales (n)	arithmetical means (\bar{x})
June	males	12	14.40	7	14.70	1	14.80	5	14.10
	females	11	15.80	9	16.10	4	14.60	4	14.40
July	both	23	15.00	16	15.50	5	14.60	9	14.20
	males	64	14.20	20	14.80	13	14.60	7	14.20
August	females	18	15.40	8	15.70	10	15.50	4	15.10
	both	82	14.40	28	15.00	23	15.00	11	14.60
September	males	36	14.70	33	14.60	10	14.80	11	14.30
	females	25	15.70	20	15.50	6	15.50	4	14.80
October	both	61	15.20	53	14.90	16	15.10	15	14.40
	males	35	14.80	24	15.20	10	14.60	7	14.30
Whaling season	females	25	16.00	18	15.00	11	15.60	8	16.00
	both	60	15.30	42	15.10	21	15.10	15	15.20
Whaling season	males	15	15.30	1	13.80	3	15.80	1	12.60
	females	15	16.50	3	13.70	5	14.90	4	15.30
Whaling season	both	30	15.90	4	13.70	8	15.20	5	14.70
	males	162	14.60	85	14.00	37	14.70	31	14.20
Whaling season	females	94	15.90	58	15.40	36	15.30	24	15.30
	both	256	15.00	143	14.60	73	15.00	55	14.70

Remark: this species was not caught during the month of November, in the whaling seasons 1966-1967.

T A B L E V I I I
 Mean lengths (m) of minke whales caught off Northeastern coast of Brazil, during the whaling seasons 1964-1967.

Months	Sexes	Whaling seasons							
		1964		1965		1966		1967	
		whales (n)	arithmetic means (\bar{x})	whales (n)	arithmetic means (\bar{x})	whales (n)	arithmetic means (\bar{x})	whales (n)	arithmetic means (\bar{x})
June	males	—	—	1	8.60	1	7.60	—	—
	females	—	—	—	—	—	—	3	8.10
	both	—	—	—	—	—	—	—	—
July	males	—	—	3	8.30	13	7.80	14	7.90
	females	—	—	2	8.10	12	8.10	22	7.90
	both	—	—	5	8.20	25	8.00	36	7.90
August	males	1	8.50	4	8.50	11	7.90	21	8.00
	females	3	8.50	8	8.00	17	8.30	39	8.50
	both	4	8.50	12	8.50	28	8.20	60	8.30
September	males	4	8.00	17	9.00	25	8.20	27	8.40
	females	1	8.60	11	8.20	64	8.60	83	8.80
	both	5	8.10	28	8.70	89	8.50	110	8.70
October	males	11	8.60	6	9.30	33	8.60	46	8.30
	females	24	9.00	19	9.90	98	9.00	113	8.80
	both	35	8.90	25	9.70	131	8.90	159	8.70
November	males	—	—	—	—	25	8.70	40	8.40
	females	—	—	—	—	52	9.10	67	8.90
	both	—	—	—	—	77	9.00	107	8.70
Whaling season	males	16	8.40	30	9.10	108	8.30	148	8.30
	females	28	9.00	41	8.90	243	8.80	327	8.70
	both	44	8.80	71	9.00	351	8.70	475	8.60

T A B L E I X

Mean lengths (m) of blue whale, humpback whales, and sperm whales caught off Northeastern coast of Brazil, during the whaling seasons 1964-1967.

Whaling seasons	Whales (n)	Sexes	Arithmetic means (x)	
			males	females
Blue whale				
1965	1	female	27.30	
Humpback whales				
1967	8	males	11.90	
	5	females	12.90	
	13	both	12.30	

Sperm whales	
1964	1965
4	4
10	10
14	14
7	7
17	17
24	24
10	10
10	10
20	20

Sperm whales	
1966	1967
males	males
females	females
both	both
males	males
females	females
both	both
males	males
females	females
both	both

T A B L E X

Distribution of sei whale catches off Northeastern coast of Brazil, during the whaling season of 1964.

Sea areas	Months												Whaling season			
	June		July		August		September		October		Whaling season		males	females		
	males	females	males	females	males	females	males	females	males	females	males	females				
1.3.6/00.34/10	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1	—
1.3.6/20.34/20	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1
1.3.6/30.34/10	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	1
1.3.6/30.34/20	—	—	1	—	—	2	—	—	—	—	—	—	—	—	3	2
1.3.6/30.34/30	—	—	—	—	—	1	—	1	—	—	—	—	—	—	2	—
1.3.6/40.34/00	—	—	2	—	—	—	—	—	—	—	—	—	—	—	2	—
1.3.6/40.34/10	—	—	2	1	—	4	—	—	—	—	—	—	—	—	7	4
1.3.6/40.34/20	2	1	9	2	7	5	—	—	—	—	—	—	—	27	16	
1.3.6/40.34/30	—	—	7	4	4	2	—	—	—	—	—	—	—	17	9	
1.3.6/50.34/00	—	—	4	2	—	—	—	—	—	—	—	—	—	4	2	
1.3.6/50.34/10	1	2	15	3	—	1	—	—	—	—	—	—	—	17	9	
1.3.6/50.34/20	3	6	16	2	13	8	—	—	—	—	—	—	—	49	30	
1.3.6/50.34/30	1	—	4	1	1	1	—	—	—	—	—	—	—	11	8	
1.3.7/00.34/00	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	2
1.3.7/00.34/10	3	—	1	—	—	—	—	—	—	—	—	—	—	4	—	
1.3.7/00.34/20	2	1	2	1	2	3	—	—	—	—	—	—	—	12	8	
1.3.7/00.34/30	—	—	—	—	2	—	—	—	—	—	—	—	—	2	2	
1.3.7/10.34/20	—	—	—	—	2	—	—	—	—	—	—	—	—	4	—	
Totals	12	11	64	18	36	25	35	25	15	15	162	94				

T A B L E X I
Distribution of sei whale catches off Northeastern coast of Brazil, during the whaling season of 1965.

Sea areas	Months								Whaling season			
	June		July		August		September		October		Whaling season	
	males	females	males	females	males	females	males	females	males	females	males	females
1.3.6/30.34/10	—	—	1	1	—	1	—	—	—	—	1	—
1.3.6/30.34/20	—	—	4	—	—	—	—	1	—	—	4	2
1.3.6/30.34/30	—	1	—	—	—	—	—	—	—	—	—	2
1.3.6/40.34/10	2	2	—	—	—	—	—	—	—	—	4	2
1.3.6/40.34/20	—	—	—	—	—	—	—	2	—	—	4	4
1.3.6/40.34/30	—	—	1	—	—	—	—	—	—	1	4	1
1.3.6/50.34/00	—	—	—	—	—	1	—	—	—	—	—	1
1.3.6/50.34/10	3	4	—	1	—	2	—	—	—	—	7	7
1.3.6/50.34/20	1	1	—	1	—	4	—	—	—	1	24	10
1.3.6/50.34/30	—	—	—	—	12	2	—	—	—	—	7	6
1.3.6/50.34/40	1	—	—	—	2	2	—	—	—	—	1	—
1.3.7/00.31/10	—	—	—	—	—	—	—	—	—	—	15	—
1.3.7/00.34/20	—	—	7	2	8	1	—	—	—	—	7	3
1.3.7/00.34/30	—	—	—	3	3	4	—	—	—	—	2	11
1.3.7/10.34/00	—	—	—	—	1	3	—	—	—	—	1	9
1.3.7/10.34/10	—	—	3	—	—	—	—	—	—	—	3	—
1.3.7/20.34/10	—	—	1	—	—	—	—	—	—	—	1	—
Totals	7	9	29	8	33	20	24	18	1	3	85	58

TABLE XII

Distribution of sei whale catches off Northeastern coast of Brazil, during the whaling season of 1966.

Sea areas	Months												Whaling season	
	June		July		August		September		October		Whaling season		males	females
	males	females	males	females	males	females	males	females	males	females	males	females		
1.3.6/10.34/10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.6/10.34/20	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.6/20.33/30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.6/20.34/10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.6/20.34/20	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.6/30.34/00	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.6/40.34/10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.6/40.34/20	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.6/40.34/30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.6/50.34/00	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.6/50.34/10	1	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.6/50.34/20	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.6/50.34/30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.7/00.33/40	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.7/00.34/00	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.7/00.34/10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.7/00.34/20	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.7/00.34/30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.7/10.33/50	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.7/10.34/00	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.7/10.34/10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.7/10.34/20	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.7/10.34/30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.7/20.34/00	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.7/20.34/20	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.7/30.33/20	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals	1	4	13	10	10	6	10	11	3	5	37	36		

Remark: this species was not caught during the month of November.

TABLE XIII
Distribution of sei whale catches off Northeastern coast of Brazil, during the whaling season of 1967.

Sea areas	Months												Whaling season	
	June		July		August		September		October		Whaling season		males	females
	males	females	males	females	males	females	males	females	males	females	males	females		
1.3.6/30.34/10			1										1	
1.3.6/40.34/00				1										1
1.3.6/40.34/10				1										1
1.3.6/40.34/20													3	1
1.3.6/50.34/00			2										7	4
1.3.6/50.34/10			2										5	1
1.3.6/50.34/20													3	2
1.3.6/50.34/30													8	2
1.3.7/00.34/10													1	2
1.3.7/00.34/20			2										4	8
1.3.7/00.34/30													1	1
1.3.7/10.34/10													1	1
1.3.7/10.34/20														
1.3.7/20.34/00			1										1	1
1.3.7/30.33/40			2										2	
1.3.7/30.34/40			1										1	1
1.3.8/00.34/20														
Totals	5	4	7	4	11	8	1	4	31	24				

Remark: this species was not caught during the month of November.

TABLE XIV

Distribution of minke whale catches off Northeastern coast of Brazil, during the whaling season of 1964.

Sea areas	Months						Whaling season	
	August		September		October		males	females
	males	females	males	females	males	females		
1.3.6/40.34/20	—	—	2	1	2	8	4	9
1.3.6/40.34/30	—	—	1	—	1	1	2	1
1.3.6/50.34/20	—	—	—	—	6	6	6	6
1.3.6/50.34/30	—	—	1	—	2	9	3	9
1.3.7/00.34/10	—	1	—	—	—	—	—	1
1.3.7/00.34/20	1	2	—	—	—	—	1	2
Totals	1	3	4	1	11	24	16	28

Remark: this species was not caught during the months of June and July.

TABLE XV

Distribution of minke whale catches off Northeastern coast of Brazil, during the whaling season of 1965.

Sea areas	Months								Whaling season		
	June	July		August		September		October		males	females
	females	males	females	males	females	males	females	males	females		
1.3.6/30.34/20	—	—	—	—	—	—	1	—	—	—	1
1.3.6/40.34/20	—	1	—	—	—	1	—	—	1	2	1
1.3.6/40.34/30	—	—	1	—	3	3	2	—	—	3	6
1.3.6/50.34/10	1	1	—	—	—	—	1	—	—	1	2
1.3.6/50.34/20	—	—	—	2	3	10	4	1	3	13	10
1.3.6/50.34/30	—	1	1	2	—	2	—	2	5	7	6
1.3.6/50.34/40	—	—	—	—	—	—	—	—	1	—	1
1.3.7/00.34/20	—	—	—	—	1	1	2	1	6	2	9
1.3.7/00.34/30	—	—	—	—	—	—	1	1	3	1	4
1.3.7/10.34/20	—	—	—	—	—	—	—	1	—	1	—
1.3.7/30.34/10	—	—	—	—	1	—	—	—	—	—	1
Totals	1	3	2	4	8	17	11	6	19	30	41

higher relative abundance during the months from September to November.

Table VIII presents mean length data on minke whales captured in the 1964-1967 seasons. Excepting the year of 1965, smaller mean lengths for males than for females are registered. The mean length monthly distribution maintains, in general, certain uniformity, females having larger sizes.

The distribution of minke whale killings by sea areas during the 1964-1967 seasons (tables XIV to XVII), shows some concentrations, although not well defined. In the whaling seasons analysed, minke whale killings were effected on the areas comprised between the following latitudes and longitudes: in 1964 — from 6°40' to 7°10'S, and from 34°10' to 34°40'W; in 1965 — from 6°30' to 7°40'S, and from 34°10' to 34°50'W; in 1966 — from 6°10' to 7°50'S, and from 33°50' to 34°50'W; in 1967 — from 6°30' to 7°50'S, and from 33°40' to 34°50'W.

OBSERVATIONS ON BLUE WHALE

A single blue whale individual was captured during the whaling seasons 1964-1967 off northeastern Brazil; this occurred in September, 1965, when a female measuring 27.30 m in length was captured in area 1.3.6/40.34/20 (tables IV, V, VI, IX, and XVIII).

OBSERVATIONS ON HUMPBACK WHALE

During the 1964-1967 whaling seasons off northeastern Brazil, humpback whales were only captured in 1967, with a total killing of 13 individuals, representing 2.3% of the catches, and 5.2 B.W.U., with a capture per whaler trip of 0.08 whales, and 0.03 B.W.U. (table IV).

These captures were effected during the months from July to October, males predominating over females (tables V and VI), the

TABLE XVI
Distribution of minke whale catches off Northeastern coast of Brasil, during the whaling season of 1966.

Sea areas	Months												Whaling season		
	June		July		August		September		October		November		males	females	
	males	females	males	females	males	females	males	females	males	females	males	females	males	females	
1.3.6/10.34/30					1	1								1	
1.3.6/20.34/20				1											1
1.3.6/20.34/10					1	2								2	4
1.3.6/30.34/20								3	8					3	25
1.3.6/40.34/10										1				3	2
1.3.6/40.34/20					2									3	1
1.3.6/40.34/30															2
1.3.6/40.34/40										1					1
1.3.6/50.34/00															2
1.3.6/50.34/10				3				14	13					3	24
1.3.6/50.34/20				2				7	13					3	53
1.3.6/50.34/30				1				1	5					6	27
1.3.6/50.34/40														1	
1.3.7/00.33/50														1	
1.3.7/00.34/00														1	
1.3.7/00.34/10	1					2		1	6						3
1.3.7/00.34/20					2	4			5					13	29
1.3.7/00.34/30									2					14	28
1.3.7/10.34/00														5	9
1.3.7/10.34/10														2	4
1.3.7/10.34/20														4	8
1.3.7/10.34/30														4	7
1.3.7/20.34/10														1	3
1.3.7/20.34/20														1	2
1.3.7/20.34/30														1	4
1.3.7/30.34/00														1	1
1.3.7/30.34/20														1	1
1.3.7/40.34/30														1	2
Totals	1	13	12	11	17	25	64	33	98	25	52	108	243		

TABLE XVII
Distribution of minke whale catches off Northeastern coast of Brasil, during the whaling season of 1987.

Sea areas	Months										Whaling season			
	June		July		August		September		October		November		males females	
	males	females	males	females	males	females	males	females	males	females	males	females	males	females
1.3.6/30.33/50														1
1.3.6/30.34/10				2				1						3
1.3.6/30.34/20											1			1
1.3.6/30.34/30											2			2
1.3.6/40.33/40														
1.3.6/40.33/50														
1.3.6/40.34/00														4
1.3.6/40.34/10				1				2						8
1.3.6/40.34/20				2				3						4
1.3.6/40.34/30				1				1						12
1.3.6/40.34/40														2
1.3.6/50.33/40														
1.3.6/50.33/50														1
1.3.6/50.34/00														5
1.3.6/50.34/10														2
1.3.6/50.34/20														40
1.3.6/50.34/30				1				9						24
1.3.6/50.34/40				1				6						22
1.3.6/50.34/50				2				9						10
1.3.7/00.34/00														2
1.3.7/10.34/30														6
1.3.7/10.34/40														2
1.3.7/00.34/20														1
1.3.7/00.34/30														6
1.3.7/00.34/40														43
1.3.7/00.34/50														67
1.3.7/10.34/00														13
1.3.7/10.34/10														1
1.3.7/10.34/20														1
1.3.7/20.33/40														1
1.3.7/20.33/50														2
1.3.7/20.34/00														3
1.3.7/20.34/10														2
1.3.7/20.34/20														1
1.3.7/20.34/30														2
1.3.7/20.34/40														5
1.3.7/20.34/50														1
1.3.7/30.33/40														1
1.3.7/30.33/50														2
1.3.7/40.34/00														3
Totals	3		14	22	21	39	27	83	46	113	40	67	148	327

T A B L E X V I I I

Distribution of blue whale, humpback whale, and sperm whale catches off Northeastern coast of Brazil, during the whaling seasons 1964 — 1967.

Sea areas	Whaling seasons										
	1964		1965			1966		1967			
	sperm whale		blue whale	sperm whale		sperm whale		humpback whale		sperm whale	
	males		females	males	females	males	females	males	females	males	females
1.3.6/20.34/30	—	—	—	—	—	—	—	—	—	—	—
1.3.6/30.34/10	—	—	—	—	—	2	—	—	—	—	—
1.3.6/40.34/10	—	—	—	—	—	4	—	—	—	—	—
1.3.6/40.34/20	—	—	1	—	—	—	—	—	—	—	—
1.3.6/50.34/00	—	—	—	—	—	—	—	—	—	—	—
1.3.6/50.34/10	1	—	—	—	—	—	—	—	—	—	—
1.3.6/50.34/20	—	—	—	2	—	—	—	—	—	—	—
1.3.6/50.34/30	2	—	—	2	—	2	—	—	—	—	—
1.3.6/50.34/40	—	—	—	—	—	—	—	—	—	—	—
1.3.7/00.33/40	—	—	—	—	—	—	—	—	—	—	—
1.3.7/00.34/00	—	—	—	—	—	—	—	—	—	—	—
1.3.7/00.34/10	1	—	—	—	—	—	—	—	—	—	—
1.3.7/00.34/20	—	—	—	—	—	—	—	—	—	—	—
1.3.7/00.34/30	—	—	—	—	—	—	—	—	—	—	—
1.3.7/00.34/40	—	—	—	—	—	—	—	—	—	—	—
1.3.7/10.33/40	—	—	—	—	—	—	—	—	—	—	—
1.3.7/10.34/00	—	—	—	—	—	—	—	—	—	—	—
1.3.7/10.34/10	—	—	—	—	—	—	—	—	—	—	—
1.3.7/10.34/20	—	—	—	—	—	—	—	—	—	—	—
1.3.7/20.34/30	—	—	—	—	—	—	—	—	—	—	—
1.3.7/40.34/00	—	—	—	—	—	—	—	—	—	—	—
Totals	4	1	—	4	10	7	17	8	5	10	10

latter with larger mean length than the former (table IX).

The killing ground was comprised between latitudes 6°50' and 7°30'S, and longitudes 34°20' and 34°50'W (table XVIII).

OBSERVATIONS ON SPERM WHALE

In the 1964-1967 whaling seasons off northeastern Brazil, sperm whale captures were rather small, reaching a maximum of 24 individuals in 1966. Other maximum values registered are: percentage of total capture — 6.1% in 1965; killings in B.W.U. — 12.0 in 1966; killings per trip — 0.15 sperm whales, corresponding to 0.07 B.W.U., in 1966 (table IV).

The killings were random monthly distributed during the whaling seasons, females predominating over males in 1965 and 1966, balance occurring between both sexes in 1967, and only males been caught in 1964 (table V).

Killings per whaler trip data do not show any tendency, in their monthly variation (table VI).

In the seasons when killings for both sexes were recorded, males mean lengths were superior to those of females (table IX).

The killing ground was comprised between the following latitudes and longitudes: in 1964

— from 6°50' to 7°10'S, and from 34°10' to 34°40'W; in 1965 — from 6°40' to 7°20'S, and from 34°10' to 34°40'W; in 1966 — from 6°20' to 7°20'S, and from 33°40' to 34°40'W; in 1967 — from 6°40' to 7°50'S, and from 34°00' to 34°40'W (table XVIII).

FINAL CONCLUSIONS

In the two last whaling seasons analysed (1966-1967), some facts are outstanding, such as longer duration of the whaling period, that was extended until late November; the minke whale predominance in the total killings; and the increase of the killing ground areas.

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