

Title **DESCRIPTIVE ANALYSIS OF HAUL DATA FROM F/V “ATLANTIC NAVIGATOR” IN ELEPHANT ISLANDS (48.1), SOUTH GEORGIA ISLANDS (48.3) AND SOUTH ORKNEY ISLANDS (48.2) KRILL FISHERY (SUMMER 2004 - EARLY WINTER 2005).**

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ABSTRACT

Data from individual hauls carried out by krill F/V “Atlantic Navigator” operating in three fishing zones were analyzed: Elephant islands zone (48.1), South Georgias islands zone (48.3) and South Orkney islands zone (48.2). The fishing season was extended from 19/2/04 (summer 2004) to 7/4/05 (early winter 2005) with a total of 251 days of effective fishing. Descriptive study of the fishery operation was performed for the two fishing systems used: conventional fishing system (CON) and the continuous fishing system with air-bubbling suspension and suction of capture (CFS). Individual haul data were analyzed to describe differential catch rates (catch per day and catch per minute) of the three different fishing zones studied. The total catch registered was 41837 tonnes: 50% of this capture was obtained at South Orkney islands zone. The highest catch rate were calculated for the same fishing zone with CFS (293 kg/min) during summer 2005. The biggest krill size also corresponded to this zone and season: 50 mm total length. Sexual proportion determined when possible (summer 2005) was determined: males 64,59%, females 28,00% and immature individuals 7,38%. Predominant colour of sampled individuals was determined IC for winter season 2004 and IIC and IIB for summer to winter 2005. All data was recorded under the CCAMLR Scheme of International Scientific Observation (SC-CAMLR, 1993).

Key words: krill fishing, Elephant islands, South Georgias islands; South Orkney islands, catch rate, conventional fishing, continuous fishing, krill size, krill colour.

SUMMARY OF FINDINGS AS RELATED TO NOMINATED AGENDA ITEMS

Agenda Item Findings.

Item: Krill descriptive fishing from Elephant, South Georgias and South Orkney Islands.

Findings: geographic ubication of fishery summer-winter 2004 and 2005, catch rate per day, catch rate per minute, fishing depth, modal total length, predominant colouration, comparative fishing systems conventional (CON) and continuous fishing (CFS).

Submitted on the request of the Scientific Committee (SC-CAMLR-XXIII, paragraph 4.4)

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“Descriptive Analysis of haul data from F/V “Atlantic Navigator” in Elephant Islands (48.1), South Georgias Islands (48.3) and South Orkney Islands (48.3) krill fishery (summer 2004 - early winter 2005).”

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ABSTRACT

Data from individual hauls carried out by krill F/V “Atlantic Navigator” operating in three fishing zones were analyzed: Elephant islands zone (48.1), South Georgias islands zone (48.3) and South Orkney islands zone (48.2). The fishing season was extended from 19/2/04 (summer 2004) to 7/4/05 (early winter 2005) with a total of 251 days of effective fishing. Descriptive study of the fishery operation was performed for the two fishing systems used: conventional fishing system (CON) and the continuous fishing system with air-bubbling suspension and suction of capture (CFS). Individual haul data were analyzed to describe differentially catch rates (catch per day and catch per minute) of the three different fishing zones studied. The total catch registered was 41837 tonnes: 50% of this capture was obtained at South Orkney islands zone. The highest catch rate were calculated for the same fishing zone with CFS (293 kg/min) during summer 2005. The biggest krill size also corresponded to this zone and season: 50 mm total length. Sexual proportion determined when possible (summer 2005) was determined: males 64,59%, females 28,00% and immature individuals 7,38%. Predominant colour of sampled individuals was determined IC for winter season 2004 and IIC and IIB for summer to winter 2005. All data was recorded under the CCAMLR Scheme of International Scientific Observation (SC-CAMLR, 1993).

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RESUMEN

Se realizó el análisis individual de datos provenientes de lances realizados por el krillero B/P “Atlantic Navigator” que operó en tres diferentes zonas de pesca: islas Elefante (48.1), islas Georgias del Sur (48.3) e islas Orcadas del Sur (48.2). La temporada de pesca se extendió desde 19/2/04 (verano 2004) a 7/4/05 (invierno temprano 2005) con un total de 251 días de pesca efectiva. Se realizó el estudio descriptivo de la operación de pesca de los dos sistemas utilizados: pesca convencional (CON) y pesca continua con suspensión por burbujeo de aire y succión de la captura (CFS). Los datos de los lances fueron analizados individualmente para describir en forma diferencial las tasas de captura (captura diaria y captura por minuto) de las tres diferentes zonas de pesca estudiadas. La captura total registrada fue de 41837 toneladas: 50% de esa captura fue obtenida en la zona de las islas Orcadas del Sur. La mayor tasa de captura fue calculada para la misma zona de pesca con CFS (293 kg/min) durante verano 2005. La talla más grande de krill

también correspondió a esta zona y estación: longitud total de 50 mm. La proporción sexual, cuando fue posible (verano 2005), se determinó según: machos 64,59%, hembras 28,00% e individuos inmaduros 7,38%. El color predominante de los individuos muestreados fue determinado en IC para invierno 2004 y en IIC y IIB paea verano a invierno 2005. Todos los datos fueron registrados bajo el Esquema de Observación Científica Internacional (SC-CAMLR, 1993).

MATERIAL AND METHODS

Introduction.

From March 2004 to April 2005 the krill fishery performed by the F/V "Atlantic Navigator", from Vanuatu, was observed by uruguayan Scientific Observers of the National Direction of Aquatic Resources (Uruguay). This krill fishing vessel (KF/V) operated in the CCAMLR Statistical Area 48, carrying out exploratory fishing in the subareas 48.1 (Elephant Islands surroundings), 48.2 (South Orkney Islands surroundings) and 48.3 (South Georgias Islands surroundings).

The main krill fishing season occurs during the austral winter from Georgias Islands to the southern Orkney and Elephant Islands during spring and summer when the ice decreasing allows the fishing operations in high latitudes. All data obtained by the Scientific Observers have been analyzed (geographical position, duration, catch and effort per haul) and all the not consistent records were eliminated. The proportion of deleted or missing records was approximately 8%.

Database description.

Data obtained by the Scientific Observers were registered and communicated under the CCAMLR Scheme of International Scientific Observation (SC-CAMLR, 1993) including haul date and geographical position, net shoot time, fishing start and end time and haul end time.

Defining the studied variables, considering the hauls of the conventional fishing system (CON) many definitions from Trathan *et al.* (1998) were used: a) shoot time: time at the start of shooting the net por each trawl; b) fishing start time: time at which shooting was completed and the net began to fish; c) fishing end time: time at which hauling started and the net stopped fishing; d) fishing period: time between the start and end of fishing.

Considering the not-conventional system of continuous fishing with air-bubbling suspension system (CFS), the same variables were used but considering the fishing effort by the fishing period definition strictly: time between the start and end of effective fishing. Also the total catch per haul (kilograms), catch rate per day (kg/day) and catch rate per minute (kg/min) were registered. The fishing depth of the net and the bottom depth in the moment of the catching were determined by ecoic register (sonar and net-sonde) of the fishing unit.

Analysis of records, fishing gear and methodology.

KF/V "Atlantic Navigator" carried out two different methodologies and fishing gear: a) conventional fishing system with pelagic net (CON); b) not-conventional system of continuous fishing system, with pelagic net with air-bubbling suspension and continuous suction of catch (CFS). Both methods were alternatively used, depending on the following factors: a) distribution, density and behaviour of krill concentrations; b) meteorologic and oceanographic conditions (ice-pack aggregations that prevent from fishing); c) fishing master decisions; d) krill catch processing capacity of factory.

Capture methodology of krill included the following stages: a) ecoic-searching and definition of swarms or krill concentrations; b) fishing methodology election, including conventional exploratory hauls for cuantitative and qualitative estimation of capture; c) catch by CON system or CFS.

The ecoic equipment used were Simrad ES500 Ecosonde and Sonar Simrad SR 240.

Pelagic nets were used by two different modalities: a) trawling net for conventional pelagic krill fishing, mesh 22 mm in the bottom (copus), 74 m to 95 m of superior and inferior scoffer (burlon), 22 m to 30 m of vertical opening, 800 to 1000 meshes "diamond" oriented, polivalent type Egersund doors with 14 square meters of surface and 3500 kg of weight; b) pelagic net similar to the cited one but adapted to continuous fishing, with a thin hose for suspension of krill concentrations in front of the net mouth by air-bubbling, and another thick hose for suction of the krill catch (width 22 cm).

Both fishing methodologies used the prevention dispositive named RIST, which consisted on a metallic grid before the net mouth that prevented against incidental capture of medium and big organisms (big pelagic fishes, birds and marine mammals) from the net. This dispositive showed to be much effective in that objective.

Fishing season and fishing periods.

The fishing season studied was extended from 19/2/04 to 7/4/05, with interruptions between fishing periods. The season started on summer of the year 2004 and finished on early winter of the year 2005. The fishing zones were: Elephant Islands zone (Observer Ebol Rojas) 19/2/04-4/3/04; South Orkney Islands zone (Observer Eduardo Mujica) 23/4/04-14/5/04 and 25/3/04-1/4/04; Elephant Island zone 30/5/04-8/6/04 and South Georgias Islands zone (Observer Pablo Meneses) 11/6/04-25/7/04; South Georgias Islands zone (Observer Danae Canepa) 23/9/04-20/10/04; South Orkney Islands zone (Observer Elizabeth Delfino) 28/1/05-26/2/05 y 10/3/05-7/4/05.

Fishing vessel.

Krill fishing vessel “Atlantic Navigator” was registered in Port Vila (Vanuatu). Distinctive call YJQS7. Ship type: pelagic stern trawler; 6759 TRB; 96.20 m length; 18.5 m width; loading capacity 2630 m³; Motor Warsilla 2 x 3290 KW. Acoustic equipment on board Simrad ES500 Sonde, Sonar Simrad FS903 and SR240. GPS Northstar 915X. Control system Skanti. Net sonde Scanmar.

RESULTS

Fishing seasons and number of fishing days.

Haul based data considered in this analysis included from summer 2004 to the early winter 2005. The cited fishing season was divided by the geographical locations or fishing zones: CCAMLR Subareas 48.1, 48.2 and 48.3 (Table 1). The total number of effective fishing days was 251 in all zones studied.

Table 1. Fishing zones, season and number of days of effective krill fishing.

CCAMLR Zone	Fishing zone	Period	Season	Nº fishing days
48,1	Elephant Islands	Febr.-March 2004	summer-fall	10
48,1	Elephant Islands	May 2004	winter	15
48,2	S.Orkney Islands	April-May 2004	winter	22
48,2	S.Orkney Islands	Jan-Febr-March-April 2005	summer-fall-winter	59
48,3	S.Georgias Islands	June-July-Aug-Sep-Oct-Nov 2005	winter-spring	145

Elephant Islands zone. The fishing season is determined by both the presence of the krill concentrations in the zone and the of ice aggregations or packs that prevent from fishing operations. The fishing activity in this zone happened during February and March 2004 (late summer and fall). Scarce exploratory hauls were performed on May 2004 (winter).

South Georgia Islands zone. The fishing season in this zone usually commences on the latter part of May and ends in August-September. In this case, the season started in the middle of June and ended in November 2004 (winter and spring).

South Orkney Islands zone. Exploratory fishing was performed during April and May 2004 (winter) in this zone but the main fishing activity was performed from January to April 2005 (from summer to early winter) when the ice aggregations ended all possible fishing operation.

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