THE PERUVIAN ANCHOVETA SPAWNING BIOMASS. EGGS PRODUCTION METHOD (EPM). WINTER 2003

Patricia Ayón Dejo Betsy Buitrón Díaz

ABSTRACT

The spawning biomass of north-central anchovy stock for August-September was assessed at 1,265,581 t. The values of the estimated parameters were: sex ratio 0.52, fecundity 11,407 eggs / female, spawning frequency 9.6%, weight 18.2 g. We discuss and compare the weights and fertility of recent years in relation to the final estimate of the spawning biomass.

THE PERUVIAN ANCHOVETA EGGS DAILY PRODUCTION IN AUGUST – SEPTEMBER 2003

Patricia Ayón Dejo

ABSTRACT

This report shows the results about the egg daily production of *Engraulis ringens*.Two different sampler designs and two kind data sort were used. The egg daily production obtained with the new sampler design and moving regions was good. Using this new sampler design is possible to evaluate the anchovy biomass with egg daily production method and hydroacoustic Method at the same time.

PERUVIAN ANCHOVY AND OTHER PELAGIC RESOURCES HYDROACOUSTIC EVALUATION. AUGUST AND SEPTEMBER 2003

Ramiro Castillo, Salvador Peraltilla, Marceliano Segura

ABSTRACT

The cruise BIC Olaya and SNP2 0308-09, to evaluate the anchoveta spawning biomass using the method of eggs production (EPM), from August 13th to September 16th 2003, between caleta La Cruz and Punta Carretas, from 0.5 to 120 mn off the coast, reached to 150 nm from caleta La Cruz to Punta Sal. The equipment used was the ecosounder SIMRAD EK-500 primarily in the frequency of 38 kHz. The sampling was that established by IMARPE: 1.0 mn in systematic trips, perpendicular to the shoreline and parallel, separated 10 to 12.5 mn between them. Direct testing was performed by hydroacoustic method; the distribution was determined by interpolation of data; and biomass, by the method of stratification on 10'x30' isoparalitoral areas. The Peruvian anchovy (*Engraulis ringens*, 8.949.966 t) was the predominant species with greater abundance between Pimentel and Salaverry; the longnose anchovy (*Anchoa nasus*, 565,614 t), especially among Chérrepe to Chicama; the catfish (*Galeichthys peruvianus*, 480,322 t) mainly between Pimentel and Chimbote; the (*Vinciguerria lucetia*, 1,392,846
t) in areas away from the coast: Punta Sal, Punta La Negra, Callao, Pisco and Independence Bay; the giant squid (*Dosidicus gigas*, 357,243 t), spread from Puerto Pizarro to Punta Gobernador, Chérrepe to Huacho and between Pucusana to Tambo de Mora; these latt er two were found together with other mesopelagic species with vertical distribution to the 380 meters, the munida (*Pleuroncodes monodon*, 597,099 t) has decreased compared to the previous cruises.

BIOLOGICAL CHARACTERISTICS OF PERUVIAN ANCHOVETA AND OTHER PELAGIC RESOURCES DURING AUGUST – SEPTEMBER *2003*

Julio Mori, Cecilia Peña, Arturo Ventosilla

ABSTRACT

The RV Olaya and SNP2 0308- 09 cruise was carried on from caleta La Cruz to punta Infi ernillos, since August 13th to September 16th. The total catch was 8026.9 kg. The Peruvian anchoveta *Engraulis ringens*, represented 71.78% of the total, with a wide distribution between Mórrope and Casma; near to the coast because of equatorial waters and the presence of SSW between Huarmey and Tambo de Mora. The TL varied 5,5 to 17,5 cm, with modes in 9,0 and 10,0 cm in young individuals, and adult length mode in 14,0 cm. The juvenile percentage in TL was 74.71% and the weight, 50,42%. Other important species were the long nose anchovy, *Anchoa nasus* 8,95%; flying squid, *Dosidicus gigas* 7,63%; carrot lobster, *Pleuroncodes monodon* 4,71%; and light fish *Vinciguerria lucetia* 1,20%.

PHYTOPLANKTON IN WINTER 2003

Flor Chang , Elcira Delgado

ABSTRACT

The characteristics of the phytoplankton community in the period August-September 2003 are annotated. Surface plankton volumes ranged between 0.1 and 3.23 mL.m-3, off Paita and Pisco, with 0.66 mL.m-3. general average. This type of phytoplankton in surface predominated in 31% of the area evaluated. At 10 m depth, the highest cell concentration (2966x103cel.L-1) was recorded at Callao profile with a predominance of *Skeletonema costatum* and *Chaetoceros socialis*. *Ceratium breve*, indicative of equatorial surface waters, and *C. praelongum* of subtropical superficial waters denoted mixing waters from Puerto Pizarro to Punta Falsa within 30 mn, while *Protoperidinium obtusum*, cold coastal waters indicator showed a normal distribution beyond to south Mórrope.

PHYSICAL OCEANOGRAPHIC CONDITIONS IN WINTER 2003

Luis Vásquez Espinoza

ABSTRACT

The cruise BIC Olaya and SNP2 0308-09 covered Puerto Pizarro (3°30’S) to Punta Infiernillos (14°40’S) off shore, from August 14th to September 16th 2003. The conditions were warm between Puerto Pizarro and Pimentel (7°S), were normal south to Infiernillos, but were cold in the oceanic area north of Chimbote. The unusual southward projection of tropical and equatorial waters, resulting in positive anomalies of up to +5 °C off Talara to Paita. South to Pimentel the cold coastal waters were widespread, and the winds, moderate to strong, contributed to upwelling processes, except the area off Supe, where the subtropical surface water (SSW) toward the coast, motivated the coast upwelling processes were restricted to areas near the coast.

ANCHOVETA SPAWNING BIOMASS OF THE NORTH AND CENTRAL STOCK DURING WINTER 2004

Patricia Ayón, Ángel Perea

ABSTRACT

The BIC Olaya and SNP2 0408-09 cruise aimed to estimate the spawning biomass of anchoveta (*Engraulis ringens*) in the north-central stock (4 to 15°S) during winter 2004, using the method of egg production (EPM). The estimated total biomass was 4.2 million tons. The average weight for females was 18.2 g, the sex ratio was 0.5, and the batch fecundity was 15,255 oocytes per mature female, with 9.4% spawning frequency and a daily egg production of 16.506 E +13 eggs / day. The parameter with greater variability was spawning frequency of 22.9%, while the daily egg production had a CV of 3.5%.

PHYTOPLANKTON DURING WINTER 2004

Sonia Sánchez, Nelly Jacobo

ABSTRACT

This paper informs about the main characteristics of the phytoplankton community studied during the BIC Olaya and SNP2 0408-09 cruise. Plankton volumes varied between 0.06 and 8.07 mL/m3, average 0.69 mL/m3. The SST range was 13.9 to 22.3 °C. The phytoplankton was dominant in 54% of the area evaluated. *Ceratium breve*, indicator of equatorial surface waters (ESW) has been registered in Paita off shore, *C. praelongum* and *C. incisum*, indicators of subsurface equatorial waters (SEW), between Paita and Punta Falsa and between Huacho and Pucusana. *Protoperidinium obtusum* indicator cold coastal waters (CCW) was located in the coastal area from Punta Falsa until Punta Mendieta.

PHYSIC OCEANOGRAPHIC CHARACTERISTICS IN WINTER 2004

Luis Vásquez Espinoza

ABSTRACT

The observations were made during the BIC Olaya and SNP2 0408-09 cruise to evaluate the anchoveta spawning biomass. The predominance of thermal distribution indicated almost normal environmental conditions (temperature surface anomalies +0.5 and -0.5 °C) with warm areas north of Paita (+3.0 °C) with equatorial surface waters (ESW), off Callao (>+0.5 °C), with subtropical surface waters (SSW) and a cold zone (ATSM> -1 °C) from Paita to Pimentel. The salinity indicated the unusual presence of ASS south of Pimentel.

The warm north of Paita had equatorial water shifts up to 6 °S (>18 °C, >34,8 psu), approximation of ocean waters up to 30 nm off shore and CCW within 30 nm, extending its distribution in southern Pisco. SE and SW winds varied in intensity from 1.2 to 12 m/s, and were moderate to intense south of 8°S; of moderate intensity north of Punta Falsa, and weak between Chicama and Punta Falsa. The topography of the 15 °C isotherm indicated fl ows from north to south (>90 m) of Cabo Blanco to Punta Falsa, associated with Southern Extension of Cromwell Current (SECC), and converged south of Punta Falsa with the other flows from south to north.

ACOUSTIC ASSESSMENT OF DISTRIBUTION AND ABUNDANCE OF PELAGIC AND MESOPELAGIC SPECIES DURING WINTER 2004

Mariano Gutiérrez, Salvador Peraltilla

ABSTRACT

The cruise BIC Olaya and SNP2 0408-09 was held on 8 August to 5 September 2004, between Punta Infiernillos (15°S) and Cabo Blanco (4°40'S), from 1 to 100 nautical miles from the coast, making 49 transects. For oceanographic information, hydrographic profi les were made of 200 nm off Callao and Paita. The anchoveta, *Engraulis ringens*, showed extensive distribution and abundance from Talara to Punta Infiernillos, with a discontinuity compared to the area between Chimbote and Cerro Azul, where the largest nuclei were located outside the 25 nm. The munida, *Pleuroncodes monodon*, showed large coastal distribution shifted to the anchovy in certain areas, where it reached its greatest abundance indices. Mesopelagic species evaluated were: vinciguerria, *Vinciguerria lucetia*, which had unusual abundance for the season as a result of the strong influence of subtropical surface waters (SSW), especially in the south; and giant squid, *Dosidicus gigas*, spread at two broad areas, north and south.

THE ANCHOVY SPAWNING BIOMASS IN THE NORTH CENTRAL ZONE OF PERUVIAN SEA (4°36,5' – 14°40'S) AT THE LATE AUSTRAL WINTER 2005

Patricia Ayón, M. Ángel Perea

ABSTRACT

The spawning biomass between Punta Infiernillos (14O40'S) and Paita (4°36,5S) was calculated in 6.1 million tons with 95% confidential limits of ±42,29% and a variability coeffi cient of 21,15%. The female individuals average weight (W) was 16,27 g; the batch fecundity (E) was 11.386 ovocytes / female, with a sex ratio (R) of 0,51 and a spawning frequency of 0,0984. The daily egg production was 2, 16E+14 egg/day. Analysis of variables and comparison with results obtained by acoustical method was done.

PERUVIAN ANCHOVY AND OTHER PELAGIC RESOURCES ESTIMATED BY THE HYDROACOUSTIC METHOD AT LATE WINTER 2005

Ramiro Castillo, Salvador Peraltilla, Mariano Gutiérrez

ABSTRACT

The BIC Olaya, SNP2 and Imarpe VI Cruise 0508-09 to evaluate the spawning biomass of anchovy was executed from August 15th to September 24th, 2005, from Punta Infi ernillo to Talara. The distribution and biomass of the anchovy and other pelagic resources was determined. The most important species was the anchovy, with wide distribution between Punta La Negra and Chimbote (up to 150 mn in front of Salaverry), and near to coastal Pucusana and Bahía Independencia; its distribution was limited by the surface isotherm 17.5 °C, and the isohaline of 35.12 psu, and showed discontinuous nature, especially at south of Salaverry. Biomass estimated by the method of isoparalitoral areas was 7.66 x 106 t with a confidence level of 17.61%; in the estimation of transects was relatively minor. Jack mackerel (273,629 t) and chub mackerel (176,842 t) were located mainly in the south.

Near the coast were detected samasa anchovy (96,894 t), catfish (28,487 t) and múnida (965,474 t). The giant squid keeps important biomass of 433,400 t. The vinciguerria was more abundant in the south.

PERUVIAN SEA PHYTOPLANKTON DURING LATE WINTER 2005

Elcira Delgado, Flor Chang

ABSTRACT

The plankton biomass 10 nm off the Peruvian coast, had an overall average of 0.71 mL/m3, with a range between 0.05 mL/m3 (off Salaverry) and 8 92 mL/m3 (off south of Punta Governor). The phytoplankton net was abundant and 52% dominant, was distributed in three main areas: (1) 100 nm off Pisco and Chancay; (2) 60 nm off Pimentel and Huacho; and (3) 30 nm north Pimentel to Punta Gobernador. Upwelling neritic diatoms had the highest prevalence *(Skeletonema costatum, Thalassiosira angulata, Actinocyclus* sp. *Chaetoceros lorenzianus, Ch. didymus, Coscinodiscus perforatus, Thalassiosira subtilis,* and *T. patella, Ditylum brightwellii).* The most representative dinofl agellates in the neritic area were *Protoperidinium depressum, P. crassipes, Ceratium azoricum, Gonyaulax polygramma* and *Prorocentrum micans. Protoperidinium obtusum* indicator of CCW, was widely distributed from Punta Infi ernillo (until 120 nm off shore) to Paita (until 90 nm off shore. *Ceratium praelongum* indicator of superficial subtropical waters (SSW), was found only in Chimbote approximately 70 nm off shore.

BIOLOGICAL ASPECTS OF THE MAJOR PERUVIAN PELAGIC RESOURCES AT LATE WINTER 2005

Cecilia Peña, Carlos Goicochea[2] Julio Mori

ABSTRACT

The study was conducted during the cruise of the anchovy spawning biomass BIC Olaya, SNP2 and Imarpe VI 0508-09, in the area from Punta Infiernillos (15°S) to Paita (5°S) during 15th August to 24th September 2005. Four species were studied: the Peruvian anchovy, múnida, giant squid and catfish, including their distribution, concentration, structure, size, age determination and reproductive status of anchovy. The anchovy was the dominant species in the pelagic ecosystem, 37% juveniles; composed of individuals from winter 2004 and summer 2005 spawning; the ages were 0,5 and 1,0 years; with LT, 7 to 18 cm; moda 12 cm. The anchovy biomass, estimated with the hydroacoustic method was 7.6 million tons, with 52% distributed into the 5 to 7°S area, where juveniles reached to 44%. The adults were found between 8 to 12°S, with modes of 12 and 14 cm, they were a spawning biomass reduced to 42% of the total. It was noted a marked latitudinal gradient from north to south in the structure size, with a modal length from 10 cm (5°S) to 14 cm (12°S); this was a situation associated with the entry of warm water (ASS); in whose center existed a core of positive thermal anomalies. In the north it was cold, good conditions for juveniles distributed into the area between 7 to 5°S.

REPRODUCTIVE PARAMETERS OF ADULT PERUVIAN ANCHOVY AT THE END OF WINTER 2005

Ángel Perea de la Matta, Cecilia Roque García

ABSTRACT

We present the results of the obtained values on the frequency of spawning (0.088), partial fertility (7.699), sex ratio (0.51) and average females weight (15.2 g) of the anchovy *Engraulis ringens*. These parameters were used to estimate the spawning biomass of anchovy by the method of egg production (MEP), carried out during the cruise BIC Olaya, SNP2 IMARPE and LIC and VI 0508-09, from August 15th to September 24th of 2005. We discuss the fluctuation of these parameters and the status of gonadal maturity at the time of evaluation.

PERUVIAN MARINE PHYSICAL ENVIRONMENTAL CONDITIONS DURING LATE WINTER 2005

Luis Vásquez Espinoza

ABSTRACT

The study was carried out off Talara to Punta Infiernillo, during August 15th to September 24th 2005, during the 0508-09 cruise. To the north, and between Talara to Huarmey, conditions were cold; and south, until Punta Infiernillo were normal, except for a small warm area off Bahía Independencia. There was a strong projection of the cold waters north and west due to the intensification of the Humboldt Current and the winds that helped the process of upwelling, which allowed cold coastal waters (CCW) have a wide distribution mainly north of Callao. To the south, the CCW were restricted by the transgression of the Subtropical Surface Water to the coast causing that upwelling processes were restricted to coastal zones.
On the other hand, there was a large mixing zone in the south associated with the presence of the temperate waters of the Subantarctic.