

PHYTOPLANKTONIC COMMUNITY IN PERUVIAN SEA DURING SUMMER 2002

Villanueva M., Patricia and Sonia Sánchez R.

Plankton volumes were between 0,03 and 2,8 mL/m³, with a mean of 0,46 mL/m³, these were located in front of Chimbote and south to Ilo. Phytoplankton in surface was nearly absent, only present in 10% of all stations. Phytoplankton at 10 m depth varied between 9,5x10³ (Puerto Pizarro) and 1.657x10³ cel/L (Pisco). It had a diversity index (H') between 0,41 and 3,88 bits cel⁻¹. The most abundant group at 10 m depth, was the microplankton, with higher densities of diatoms in the coastal area, with *Thalassiosira anguste-lineata*, *Cylindrotheca closterium*, *Leptocylindrus danicus* and *Skeletonema costatum*. Dinoflagellates were representative in sea surface, mainly in front of the area between Puerto Pizarro to Salaverry, and south of Atico. *Ceratium breve*, ESW indicator, SSW indicator, was occasionally located between Paita and Pacasmayo and located near Punta Falsa coast.

VERTICAL DISTRIBUTION OF PERUVIAN ANCHOVY FROM TUMBES TO TACNA, DURING SUMMER 2002, RELATED WITH TEMPERATURE AND SALINITY

Castillo, P.R., L. Vásquez, M. Segura and S. Peraltilla

The cruise of hydroacoustic evaluation of pelagic resources BIC *Olaya* and *SNP2* 0202-03 was carried out from February 17th to Marchth 2002, from Tumbes down to Tacna, to an average distance of 90 mn of the coast. Echograms and acoustic bitacores by means of the Echoview program were used, and for the graphs a program of interpolation of data was used. The relation environment - resources was analyzed in the hydrographic profiles and in some trawl hauls where the capture was mainly anchoveta. The distribution of the anchoveta continues limited by the environmental conditions of the CCW, and its variation depends on the observed physical and biological processes. Nevertheless, some fractions of distribution of this species were in mixture waters, as much in the north as in the south. The resource was near the coast in considerable concentrations in CCW (15-24°C and 34,8 - 35,0 spu). Also they were found in mixture waters: in north CCW and ESW (22-23°C and 34,0 - 34,7 spu); in the north-central zone into CCW and SSW; and in the southern zone into the CCW (Cold Coastal Waters), SATW (Sub Antarctic Temperature Waters), SSW (Sub Surface Waters), and continental waters (15 - 24°C and 34.8 to 34.9 spu, for both zones). In depth, the anchoveta existence was poor, located

between Talara and Huarmey, and they reached to the 132 nm, mainly in areas far away of the coast (15-19°C and 34,6 -35,0 spu).

DISTRIBUTION AND BIOMASS OF PELAGIC RESOURCES ABUNDANT IN PERUVIAN SEA DURING SUMMER 2002

Castillo, P.R.; Marceliano Segura; Walter Castañeda and Salvador Peraltilla

The authors present the distribution and biomass of the important pelagic resources of greater abundance, detected during the Cruise BIC *Olaya* and *SNP2* 0202-03, off Peruvian coast from Tumbes to Tacna, in the period February 17th to Marchth 2002. Sampling was made in parallel systematic transects separated 17 mn between them. It was used the echosound Scientist EK-500 SIMRAD in frequencies 38 and 120 kHz. The distribution area was determined with the interpolator of data SURFER; the biomass was calculated stratified according to isoparalitoral areas 10´x30, using programs ECHOVIEW, MAPINFO and EXCEL. The Peruvian anchoveta (*Engraulis ringens*) maintained its predominance in the coastal ecosystem, In spite of being only up to 60 mn of the coast, she had a continuous distribution between Chérrepe to San Juan de Marcona; its biomass of 10,314,630 t, had great abundance in 10-11°S, and high percentage of juveniles. The Peruvian pacific sardine (*Sardinops sagax sagax*) was absent. Jack mackerel (*Trachurus murphyi*) (95,368 t) and the Pacific makerel (*Scomber japonicus*) (3,347 t) showed dispersed distribution and very reduced; the reduction had begun from September 1998, Longnose anchovy (*Anchoa nasus*) (115,876 t) was very near to the coast with an almost continuous distribution from Puerto Pizarro to Chicama, and towards the south in reached to Mollendo. The distribution of lightfish (*Vinciguerria lucetia*) (555,598 t) was scattered and it was detected in diverse nuclei between Punta Sal and Mollendo with greater continuity in the north. The catfish (*Galeichthys peruvianus*) (171, 151 t) was found in small areas near the coast between Morrope and morro Sama. The carrot lobster (*Pleuroncodes monodon*) was located from Chicama to Morro Sama, until 70 mn of the coast in Punta Infiernillo, its biomass (837,081 t) diminished in comparison with the previous cruises. The giant squid (*Dosidicus gigas*) (111,480 t) was found mainly from Supe to Ilo, in areas far away of the coast; like vinciguerria this biomass and distribution could be underestimated by the cover of the sampling.

SPAWNING SCHOOLS, FECUNDITY AND ONE CASE OF HERMAPHRODITISM IN PERUVIAN ANCHOVETA DURING THE SUMMER 2002

Buitrón Díaz, Betsy and Angel Perea de la Matta

During the Cruise 0202-03 on board of RV *Olaya* and *SNP2*, performed between February 17th and Marchth, the distribution of spawning schools and the reproductive state of Peruvian anchoveta, (*Engraulis ringens*), were

determined by means of histological analyses of ovaries, and estimated the spawning fraction initially, but it turned down gradually. Batch fecundity was estimated in 9.686 oocytes per batch (SD = 5.096). Adjusted batch fecundity for a 20 g individual weight was estimated in 10.718 oocytes per batch. This value is lower than those calculated in previous years, and this could be, mainly because, that the evaluation was not made during the main spawning period, but at the end of it. One hermaphrodite specimen was registered, which is the first one case reported for this species in our country.

DISTRIBUTION OF SEABIRDS OFF NORTHERN AND CENTRAL PERUVIAN COAST DURING SUMMER 2002

Garcia-Godos, Ignacio

Seabird sightings from 0 to 100 nautical miles in front of northern Peruvian coast, from Tumbes to Cerro Azul (Lima), on board of the RV *Olaya*, between February 17th and March 18th, are analyzed. A total of 35.765 individuals, belonging to 43 species, were recorded through 1.267 nautical miles of observation. The most abundant species were the Peruvian booby (*Sula variegata*, 39,89%) the blue footed booby (*Sula nebouxii*, 30,73%), the wedge-rumped storm petrel (*Oceanodroma tethys*, 6,72%) and the laughing gull (*Larus atricilla*, 5,84%). Guano birds dominated the distribution of seabirds, mainly in close to shore areas. The main concentration area of seabirds was at 11°S, the lowest concentration area was between 3°S and 5°S. Significant correlations were found between the mean anchovy detected value and the mean number of guano birds (guanay cormorant, Peruvian booby and Peruvian pelican) and the blue footed booby observed by quadrant. Sea surface temperature (SST) was negatively related with the distribution of many seabirds, as guano birds, Franklin gulls, Kelp gull, Waved albatrosses and Sooty shearwaters, among other species. Sea surface salinity (SSS) was significantly related with the mean numbers of the Hornby's and Elliot's storm petrels. The significant correlation observed between the guano birds and the mean values of anchovy and SST could be related with the sea surface warming and the neritic behavior of anchovy commonly occurred during summer.

ENVIRONMENTAL CONDITIONS OF PERUVIAN SEA DURING SUMMER 2002

Luis Vásquez, Patricia Villanueva, Georgina Flores, Jesús Ledesma, Patricia Ayón

The marine environmental conditions registered during the Hydroacoustic Cruise to Evaluate Pelagic Resources, realized with BIC *Olaya* and SNP2 0202-03, are described. A train of Kelvin waves arrived at early February warm conditions were present at north of Pisco; at south, the conditions were almost normal. The displacement of equatorial waters was also observed until Chicama; and of oceanic water movements conditions the location of CCW in a

coastal band toward south of 8°S, where distribution of nutrients was continuous (Punta Chao to Huarmey and Chancay to Ilo) and with higher concentrations. Plankton was broadly distributed, with the biggest concentrations in front of San Juan and between Mollendo and Ilo; phytoplakton had a predominance of 10%; the zooplankton had a predominance of 74% of total samples. The anchovy eggs, widely distributed, had a frequency >50%; the larvae, with 31% frequency, occupied, mainly, the area between Paita and Punta Mendieta inside the 100 miles of the coast.

**PERFORMANCE OF TWO PELAGIC NETS: TYPES 266X900 mm Y
140X1200 mm EN EL VERANO 2002**

Carlos M. Salazar; Germán P. Chacón and Julio R. Alarcón

During the BIC *Olaya* and *SNP2* 0202-03 cruise, the performance of the pelagic nets type 266x900 mm (PA/PE) and 140x1200 mm (PA) was evaluated in 146 trawl stations, using netsonda systems Scanmar RX-400 and Furuno CN8, placed on the fishing gear of the BIC *Olaya* and *SNP2*, respectively. Fishing strategies were developed according to the technology of each ship, and then the performance of the fishing gear was analyzed by functional relationships of vertical opening, depth of the net, cable length and speed trawl; also the analysis of the capture is presented (According to latitudinal degree and day/night time).