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Mortality of Pelicans in the Shores of the Littoral of La Libertad (Perú) from a April to May 2012

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Abstract

It describes and analyzes the causes of massive mortality of Pelican *(Pelecanus thagus*), occurred on the beaches of the Region of La Libertad (Peru) during the months of April and May 2012. The research was carried out through a census of dead birds, dying ones and watching migrating flocks, also samples of digestive tracts were taken from 20 individuals dying in order to determine food habit, and body condition (previously total weight and total length were recorded). The results showed that the cause of mortality of 200 pelicans was the absence of their preferred food (anchovy), as well the thermal anomaly conditions of sea surface waters (temperatures above 18 ºC) caused the birds to migrate to cooler waters to south or deepen. It was determined that the birds had a high-level parasitism and low body condition, which is explained by starvation.

Keywords*:* mortality, pelican, starvation

Introduction

It is well known that the distribution of populations of marine organisms are based on termic patterns on an specific area, and also causes effects on the trophic ecology of the marine ecosystem, it means that the temperature accelerates the metabolism and the reproduction of some species. On the other hand, it generates migration or deepening of other species which escape from waters with are unfavorable to them because of the temperature. The “peruvian pelican” *Pelecanus thagus* has a wide

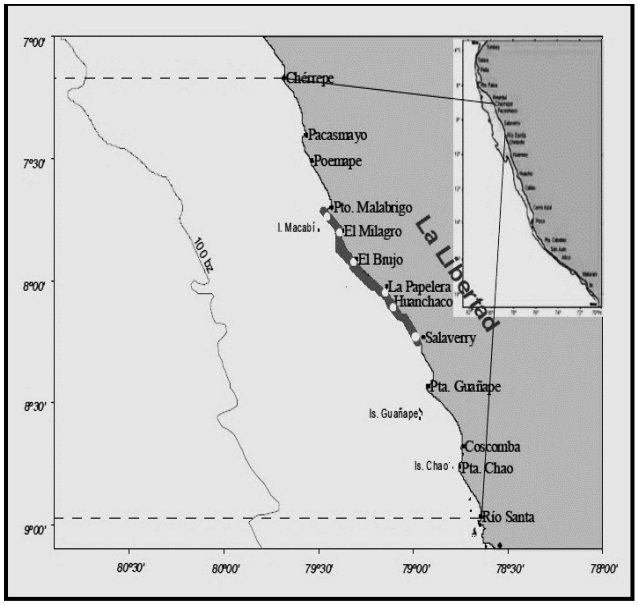
distribution along the coast of Peru, it is natural of the Humboldt current, in the Pacific coast of Southamerica. Its distribution goes from the coast an islands neart to the continent, practically in the whole country, continuous to the south along the coast until the center of Chile [1]. In 1981 the total population was estimated around 800 thousand pelicans. They usually stay on rocky islands near the continent. It is common to see them on jetties and ports. During times when there is lack of food, its number on the coast increase, when the situation is worse, although is unusual, many of them has been seen in the city of Lima, Perú. In the city they have been forced, in order to survive, to look in the garbage, feeding on carrion. During the events El Niño from 1983-84 and 1997-98 was observed this abnormal situation. The food of the "peruvian pelican" is based on fish, mainly the "peruvian anchovy" which is abundant in cold waters where this speciess lives [2]. The worst natural enemy of these birds is the fluctuations of the temperature caused by El Niño and La Niña. These oscilations are the reason for the change in the behavior of the "peruvian anchovy" looking for plankton, food of this fish, swim to deeper waters or far from the coast [3]. There are some records on massive mortality of this bird on the peruvian littoral due to two well known facts, one of them was overfishing of "peruvian anchovy" prey of these birds, this happened in the decade of 70´s and the other one were the events "El Niño" because of the warming of superficial waters of the sea. During El "Niño" 1957-58, the mortality was 35 % of the estimated population, around 28 million of adult birds and 100 % of chicks [4]. Also during El "Niño" 1972 -73, the mortality reached 57%, aproximately 6,54 millions of adults and 100 % of chicks. The population of the guano birds decreased from 6,01 millions to 0,30 millions [5]. The mortality happened in march and april of that year, large migrations were observed because of the warming of superficial waters of tha sea, and presence of illness. It was observed birds on roads and markets looking for food. Also massive mortality of "peruvian pelicans" was reported in Tumbes (Zorritos), Piura (Colán, Sechura y Parachique), these deaths were associated to the impacts of the oil explorations and by intoxication caused by oil spill [6]. This research had as objectives: Determine the causes of massive mortality of the "peruvian pelícano" *Pelecanus thagus*, happened on La Libertad beaches, during april and may in 2012.

Material and Methods

Study area

This study was carried out on beaches located in the districts of Magdalena de Cao, Huanchaco y Salaverry.

Figure 1. Area of study. Region La Libertad, Perú



Methodology

Assessment on dying and dead pelicans on beaches.

A counting was carried out on live and dead pelicans on tha sampled beaches using the direct procedure. Besides, an approach to census was employed based on the direct observation, using binoculars. On the other hand the direction of the flock, recoding the sighting locations.

The total length (L) and total weight (P) were measured on the sampled individuals, with these data, the condition factor was calculated:

F.C. = PT (kg)/L^3 (m)

Analysis of the digestive content and body condition or condition factor

Some samples of the esophagus, crops, proventriculus and intestines of 20 sacrificed pelícans were taken, then they were placed in labeled glass jarss, in alcohol at 45%. At the lab the samples were analyzed, the biological materials were classified by ítems. There were samples with fish remains, which were identified.

Análysis of the surface tempeature of the sea (TSM) and landings of "peruvian anchovy" in the study area.

An analysis of the data from the Institute of the sea of Peru (IMARPE) of the surface temperature of the sea (TSM) was carried out, to find evidence of some thermic anomaly in that season of the year, and the records of landings of peruvian anchovy from PRODUCE were obtained. The mortality of birds was related with the temperature and the landings.

Results and Discussion

Determination of dying and dead pelicans on tthe beaches of La Libertad.

The pelicans which were found dying on the beaches of Magdalena de Cao, Huanchaco y Salaverry reached the amount of 185 individuals and showed signs of exhaustion, these can be seen in the very short flights, then they rested on the beaches. Many of the dying birds, finally died along the days, not only for the weakness but also because of the attack of dogs that inhabit near beaches. Some pelicans defecated liquid and whitish excrets.

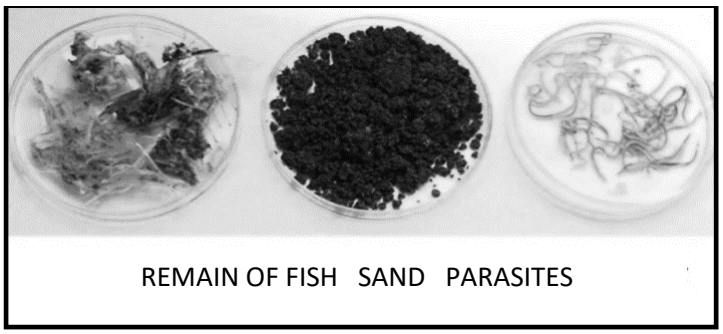
Photography .1. Liquid excretes and whitish color from Pelican.

During the journeys on the beaches, 200 pelicans were found dead. All of them with different levels of decompositión (from specimens with some hours from death, until those showed loss muscle). The highest number of dead birds happened on Magdalena de Cao beach, followed by Huanchaco and Salaverry. It is important to point out that a flock with approximately 5,000 birds were sighted migrating to the south.

Digestive content and body condition or condition factor

The specimens employed for the analyisis of the digestive content, showed ítems like: remains of fish (not peruvian anchovy), sand and a great amount of parasites (Ascaridae), just like is observed in the photograph No.2.

Photograph 2. View of the components of the digestive content in de P. thagus.



In normal times the largest pelican of 1.52 m can weight 7 k, with a condition factor of 1.99, during the analysis this parameter was less tan 1.2, this means that large pelicans loss more tan 4 k, that is why their weakness and the massive mortality.

The surface tempeature of the sea during the study, particularly for the litoral of La Libertad (Trujillo), remained at 22 ºC. In comparison with the average values for the fall season, the temperature should be between 14 to 17°C. Between Tumbes and Piura the range was 24 to 26 ºC, also between Pimentel (Lambayeque) and Callao the variation was between 20 to 23 ºC, all of these facts showed the presence of thermic anomalies. According to the records of landings of anchovy, there was none at northern littoral, but there were landings in the south of Perú.

Discussion

According to the results of this research, the massive mortality of guano birds in the northern littoral of Perú, particularly of pelicans on the beaches of La Libertad, is not a new event because there are documented references about similar facts, these were associated to factors like oceanographic thermic anomalies, overexploitation of “anchovy” and the indiscriminate fishing. Massive mortalities were recorded in 1963/64, 1965/66 and 1972/73 with numbers of 3.35; 12.13 and 4.66 millions [7]. These mortalities are similar to those years with oceanographic anomalies in the peruvian sea because of the phenomenon “El Niño”. In 1979/80 the mortality was 0.65 millions of adults and 1.31 millions of baby pelicans. The highest mortality happened in 1972/73 with 55% of the total population and 7, 9, 19 and 4% in the years 1974/75, 1976/77, 1979/80 and 1980/81[8]. El Niño 1982/83 happened during the reproductive season of pelicans and caused the total abandonment of sites of nesting and 585 adult mortality. It is relevant the thermic anomaly which is persistent at north of Perú, this fact explains the abscense of anchovy as well as the mortality of birds. It has been showed that anchovy plays an important role in de development of birds population because this species is the mean food of these birds. [9], [10], [11].

The food web of the sea is unstable due the presence of temperatures not characteristics of the season, this causes that cold water species to migrate or to go deeper [1], [2], [3], [4], [9], [10]. This statement is confirmed by the records of biomass of anchovy, these indicate absence and let know the migration to the south, accoding to the infomation of the assessment cruise of pelagic resources, addressed especially to anchovy, carried out by IMARPE between february 17 and march 31 in 2012, studying an area from Tumbes to San Juan de Marcona. The findings indicate that conditions were warm to north of Punta La Negra and offshore 50 mn from Punta Chao to Callao and cold oceanographic conditions along the coastal strip of Malabrigo to Pucusana [12]. On the other hand, among the results of this research, the birds show signs of exhaustation and hunger, caused by migrations fom their hábitat (rocky island), to beaches looking for their main food which is the anchovy, this fact was observed in other events El Niño in Perú, also in other latitudes where massive mortality of marine birds was reported [13,14]. Some of the analyzed dying specimens were characterized by the abscense of food in their digestive and others showed some remains of fish not common in their food, this was *Galeichthys peruvianus* “bagres” (fish from Sandy bottom), other characteristic was the abundant presence of parasites in the gizzads and proventriculus, no doubt this factor contribute to their weakness. Besides that, the specimens showed low weight, due to lack of food, also, this confirms the cause of migration, they were looking for food and the absence of food made them vulnerable to death. This event captured the attention of the world press and specialized scientific publications [15, 16,17,18,19,20,21].

Conclusions

The cause of the mortality of pelicans on the beaches of the litoral of La Libertad (Perú), was the lack of food (anchovy), due to the presence of warm waters they must have to migrate to the south.

Landings of “anchovy” were not recorded in the north of Perú and the surface temperature of the sea were higher tan in the normal conditions.

The analyzed birds showed parasites due to weakness because of a poor feeding.

Pelicans showed a great amount of the parasite *Ascaris* sp. in his digestive system.

Tha condition factor was too low for pelicans.

The specimens with digestive content showed remains of shore fish (“bagre”), these are not nomal food, great amount of sand (as the result of feed occasional food on the shore).

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