

**3<sup>rd</sup> Meeting of the Scientific Committee**

Port Vila, Vanuatu  
28 September - 3 October 2015

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**Distribution and Abundance of Giant Squid in Ecuadorian waters**

***J.L. Pacheco***

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## EXECUTIVE REPORT

### NATIONAL FISHERIES INSTITUTE ECUADOR

## DISTRIBUTION AND ABUNDANCE OF GIANT SQUID *Dosidiscus gigas* (D'Orbigny 1835) in Ecuadorian waters, DURING 1979-2013

J.L. Pacheco

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*Dosidiscus gigas* (D'Orbigny 1835) is an endemic Southeast Pacific cephalopod also called giant squid, abundant off the coast of Peru and Chile (Nesis 1970) and less off the coast of Ecuador. The limited information on the species in Ecuadorian waters, prompted the National Fisheries Institute (INP) to develop technical cooperation agreements with three research projects to evaluate the feasibility and fishing contribute to biological knowledge and fishery resource.

In 1979 the studies began aboard research vessels R / V Tohalli of Ecuador and F / V Shinko Maru 2 in Japan, where an automatic fishing (jigging) was adapted. The research was conducted in the first boat, between April and June 1979 and the second vessel during November and December in 1992 and continued in September and November 1993. In 1995, new research on this resource was developed at the artisanal level using fiberglass boats equipped with handlines (jigging). In 2013, to update the biological and fishing information, a new study is performed in order to find an alternative fishing for artisanal and industrial sector (Pacheco 2013). This document summarizes the results obtained during the various years of study on research fishing of the giant squid.

The giant squid during migration by Ecuadorian waters, performs vertical movements towards deepwater in the day (06h00) and surface at night (18h00) with daily horizontal movements and a South-North movement, is captured overnight (18h00-06h00), mainly in dark (newmoon).

Three species of squid in waters Ecuadorian belonging to Ommastrephid family and one specie belonging to Thysanoteuthidae family, dominated by the specie *Dosidiscus gigas* (95%) were identified.



In coastal waters, fishing areas with the highest concentration were distributed facing the Gulf of Guayaquil, mainly on the border with Peru from July to October and spread north to the coast of Ecuador in the provinces of Manabí and Esmeraldas.

In the Galapagos Islands giant squid found mainly distributed in front of the Isabela and San Cristobal Islands. Little is known about his wealth out of the 80 Mn, but is considered an excellent potential for giant squid fishing area. (Pacheco 1994).

The sea surface temperature (SST), conditioned the presence and / or absence of the giant squid fishing areas of the Ecuadorian sea. In ocean waters catches of giant squid were performed in a range of sea surface temperature (SST) between 17.9 and 26.7 ° (SST) at depths between 20 and 100 m with optimum SST between 18.6 and 24, 2 ° C, while in coastal waters in 1995 and 2013 (SST), was among 21.0 and 27.0 ° C, with an optimal capture range between 21.0 and 24.6 ° C TSM and 10 m deep. In 2013 44% of the catch corresponded to the Gulf of Guayaquil and the province of Santa Elena; Manabí 31% and 25% of Esmeraldas province.

At the industrial level in 1979, 1992 and 1993, the squid was caught in national and international waters with automatic machines (jig), recording a catch per unit effort (CPUE) in coastal waters average of 6.8 kg/mach.-time, decreasing around the Galapagos Islands to 2.2 kg / hour/ mach and international waters to 1.8 kg / hour/ máq. (Pacheco 1994).

In 1995 with artisanal handline fisheries (jigging) a maximum CPUE of 8.50 kg / man/hour was recorded in October, while artisanal vessels aboard average CPUE was recorded in the Gulf of Guayaquil of 3.12 kg / Man/hour, off the coast of Manabí 1.62 kg / man-hour and frenjte to Esmeraldas 0.93 kg / man-hour (Pacheco1998).

In directed fishing it was used as bait on thin and thick for catching large pelagic fish in 200 Mn Ecuadorian sea surface longline bycatch and was captured casually gillnet within 80 Mn.

With respect to their biology, in ocean waters mantle length (Lm) giant squid average was 30 cm and 24 cm in female male (1 year old); 87% of females had sizes between 20 and 39 cm Lm; two modal groups of between 26 and 29 cm were observed in combined sexes; The average total weight of the coat was registered 804.7 g (29.0 cm Lm) in male and 513.6 g (26.0 cm Lm) male.

In coastal waters, the size range ranged between 15 cm and 46 cm mantle length (Lm) for both sexes, with an average of 32.2 cm Lm (1 year old) and an average weight of 751.1 g. The sex ratio was 1: 4.6 with female predominance.



The stomach contents of giant squid in ocean water fish recorded 46.6%, 27.4% squid, empty stomachs 9.9, 8.6% and 7.5% unidentified crustaceans, while inshore fish recorded 45% 35.2% squid, empty stomachs 8.1, 9.1% and 2.2% unidentified crustaceans, claiming that the giant squid is a predatory fish and squid (Chong et al., 2005).

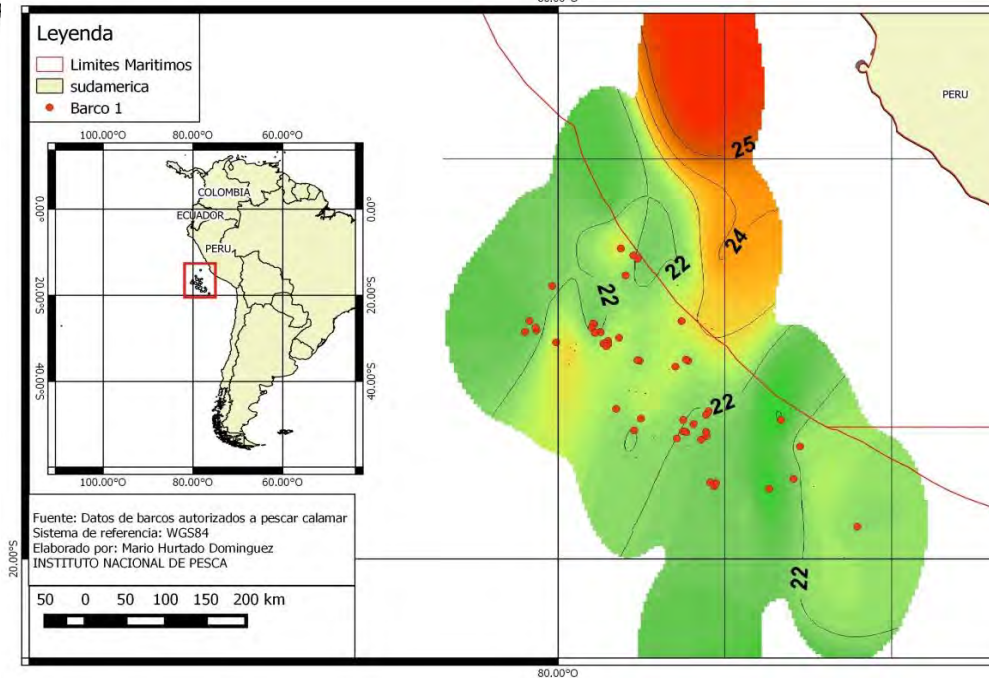
As for the stages of sexual maturity in ocean waters in September, October and November stage III (mature) at maturity recorded a 47.3% males and 23.6% females, while stage I (immature) recorded a 51.4% females and 43.0% males. In coastal waters individuals with stage III females registered a 69.5% females and 30.5% males, related to a state of gonadal development.

The giant squid *Dosidicus gigas* in Ecuadorian waters plays an important role in the marine ecosystem constitute the food of fish such as yellowfin tuna, swordfish, dorado and other commercial species captured by the Ecuadorian fishing fleet Whereas a predator squid and fish (Chong et al., 2005).

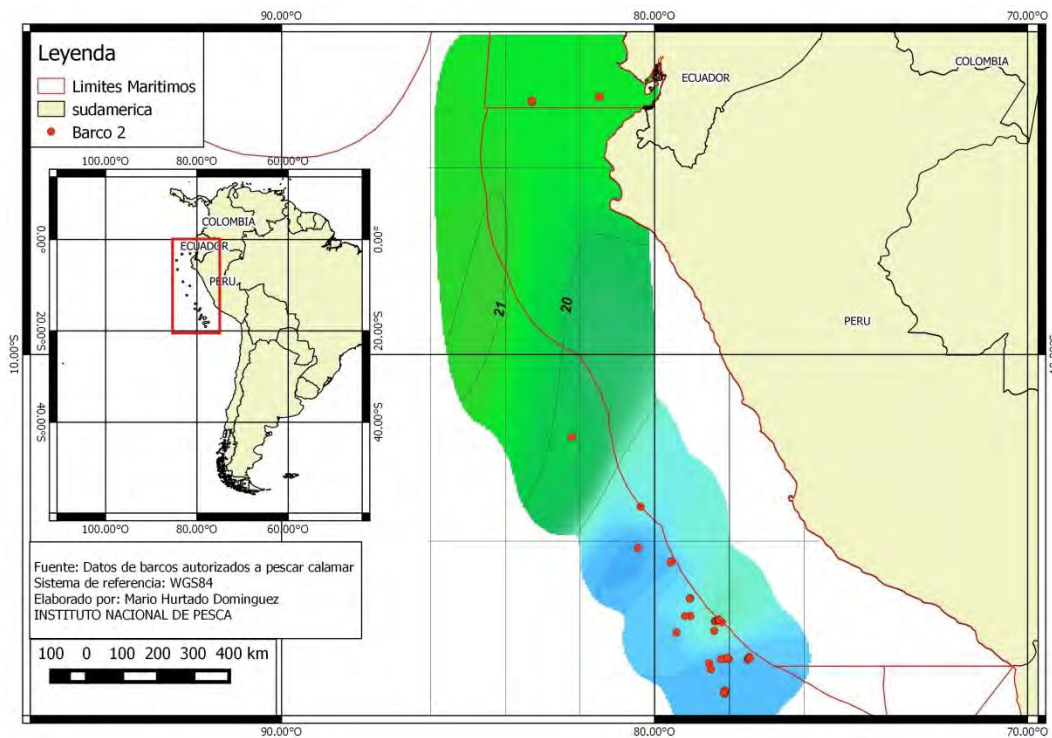
Finally it is concluded that there is little knowledge about the size of the population of giant squid in Ecuadorian waters and average landings of squid resource, but is available indicators for as catch per unit effort (CPUE) historic, which recorded an average of 6.8 kg / hour máq.-industrial level and 8.50 kg / man-hour at the artisanal level

At the end of 2014, Ecuador opened an industrial fishery with 6 vessels interested in this activity, which are capable of operating in international waters, at this time only 2 fishing vessels has begun the tasks of fishing, these boats are improving in their operation and which is still collecting information, according to information submitted by the company is estimated that until the first half of 2015 has captured about 1500 tons, this information will be sent to the Commission as the same is complete.

With the information obtained maps capture points where fishing hauls were made were developed, it is to indicate that they do not represent densities or biomass.



Gráfica 1. Fishing sites and average sea surface temperature of giant squid, november 2014 – march 2015. Vessel 1



Grafica 2. Fishing sites and average sea surface temperature of giant squid, november 2014 – march 2015. Vessel 2