

SQUID



EXECUTIVE SUMMARY

SQUID (*Dosidiscus Gigas*)

The squid is one of the common names given to certain species of marine mollusks belonging to the Cephalopoda class, a Coleoid subclass with an appearance similar to that of squid, with which it is often confused. It is similar to the squid so it is always confused with this species. It has different names in commercial use, such as: squid, giant squid or cuttlefish, Humboldt squid, in English it is known as "Jumbo Flying Squad". It is considered a neritic pelagic species (pelagic species are those that live in medium waters or near the surface, and that limit their contact with the seabed and the coast as much as possible). In Peru, squid is one of the main non-traditional export products and is exported mainly in fillets, but also in tubes, strips, dice, wings and tentacles, both fresh and raw and cooked frozen. It is a transzonal resource (they are high seas resources that also include part of the fish populations of the Exclusive Economic Zones (EEZ) that cross the 200-mile limit of the Peruvian sea and the species that make extensive migrations between the EEZ and the high seas to across oceans or numerous exclusive economic zones) found in the Eastern Pacific Ocean. In Peru, the commercialization of squid is the second most exploited hydrobiological product after anchovy, both in volume of landings and in foreign exchange earnings. Along the entire Peruvian coast, there is a great abundance of this squid from mile 10 to beyond 500 miles from the coast. It is a species with a high fertility rate, characterized by rapid growth. It reproduces only once during its life and then dies. It is estimated that it can live between one to two years, in addition to reaching more than a meter in length and weighing up to 50 kilos.

It is believed that the biomass of the squid worldwide is between 7-10 million tons, that 2-4 million tons are outside the exclusive economic zones of the countries throughout its distribution and that 1 -1.5 million tons are in dense aggregations. It is even estimated that the squid globally exerts a predation pressure of 200-250 million tons of food per year.

In 2019, two Pelagic Resources Hydroacoustic Assessment cruises were carried out, in summer (Cr. 1902-03) between February 12 and March 27 and in spring (Cr. 1909-11) between September 29 and November 15, in IMARPE vessels and in vessels of the National Fisheries Society to increase biological and acoustic sampling. The results of both cruises were analyzed to know the distribution and biomass of the neritic pelagic species: anchovy, múnida, samasa, catfish and oceanic: horse mackerel, mackerel, cuttlefish and vinciguerria in the Peruvian marine ecosystem, determining that the cuttlefish had an extensive area distribution and its biomass was calculated at 759,274 metric tons.

The Piura Region is the main exporter of squid in Peru with a participation of 89%, followed by Callao, Lima and Arequipa.

China ranks as the world's leading exporter of squid.

Most shipments to the world are made as frozen, canned, dried, salted and in brine.

SQUID DESCRIPTION

The squid is a species that can measure up to 120 cm in mantle length, weighing up to 50 kg. The part of his mantle is in the shape of a torpedo; the dorsal part is cone-shaped including its fins in the terminal part and its siphon cartilage in the shape of an inverted "T". The giant squid has eight tentacles that have two rows of suction cups and two reproducers with four rows of suction cups. Each tentacle has between 100 to 200 suckers. Its mouth has a powerful piercing beak and it has two developed eyes. This dioecious cephalopod (mollusk with the head attached to the tentacles), which has in its species two sexes, female and male, presents a certain sexual dimorphism. Males have a thick and hard cylindrical mantle compared to females, while in females the mantle extends slightly in its middle part, where the filled oviducts are found. The squid is an oceanic species that makes migrations towards the coast related to feeding and reproduction processes. Its thermal distribution is quite wide, ranging from 16°C to 30°C in equatorial waters, which is why it is considered an eurythermic species (an organism capable of withstanding large differences in temperature).

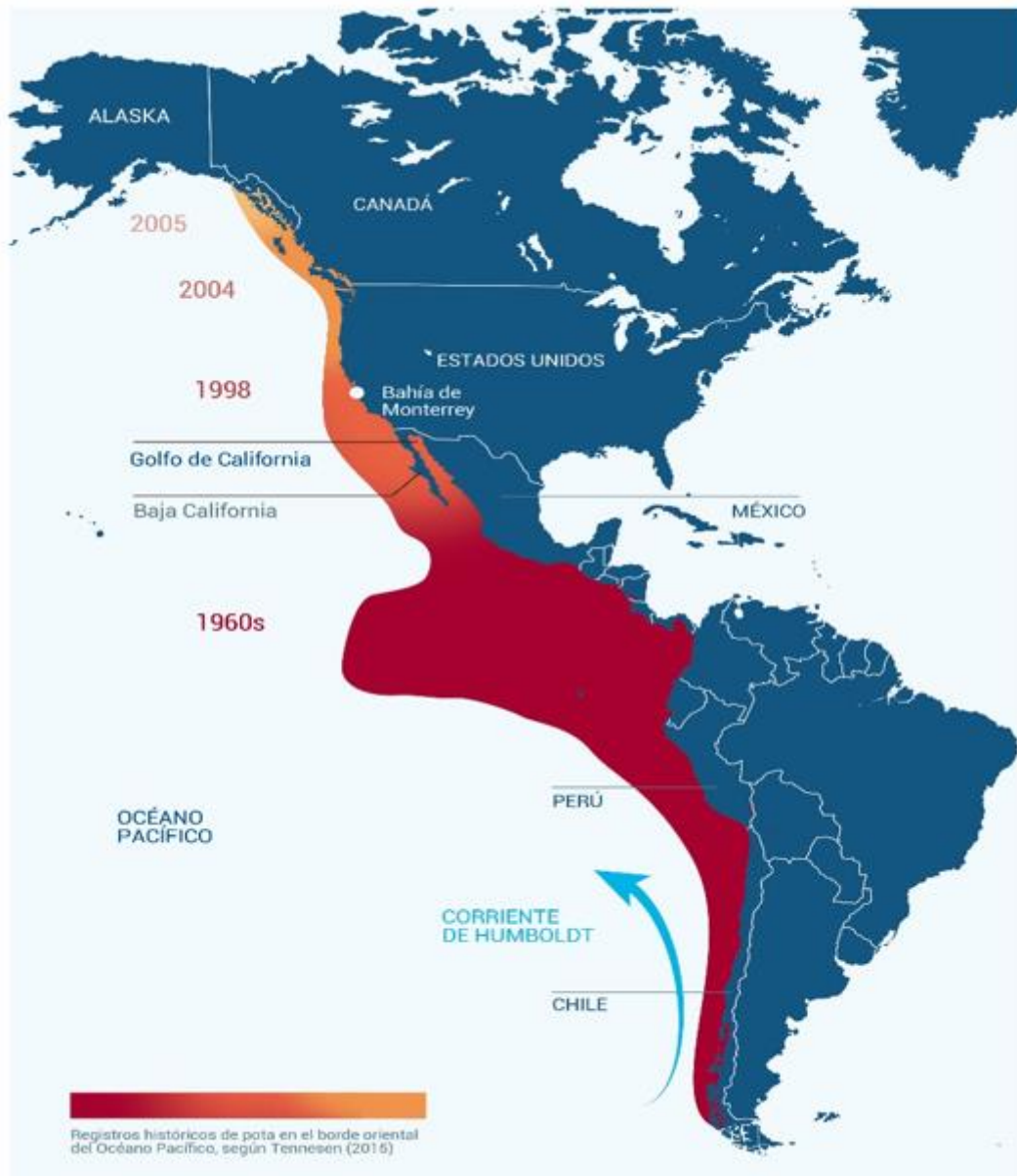
It is an active predator, being copepods, hyperid amphipods, euphasids, prawns, pelagics, red crabs "lobsters" (*Pleuroncodes planipes*), heterotropic mollusks, squid, pelagic octopods and many fish its most common foods. The feeding range changes continuously with the growth of the predator, from macroplaktonic invertebrates and fingerling fish (in juveniles) to larger fish (in adults). The main predators of the giant squid are cetaceans such as whales and sperm whales, as well as sea lions, as well as other larger species. Another cause that increases the natural mortality of this resource is the cannibalism of adult females that prey or feed on male specimens of the same species after reproduction.

Their body growth is rapid, with specimens of 1.5 m long mantle having been reported. The average monthly growth rate is estimated to be 6 cm during the first year of life and 2 cm during the second year of life.



GEOGRAPHICAL DISTRIBUTION AND HABITAT

The giant squid lives in the eastern Pacific Ocean, at depths greater than 200 m, from California (approximately 36 ° north) to Tierra del Fuego, presenting its greatest abundance between the Equator and 18 ° south and from 16 ° to 28 ° north. , and from the coasts of North and South America at 125°W, the highest concentrations occur on the outskirts of the Peruvian coasts in the southern hemisphere and in the Gulf of California in the northern hemisphere

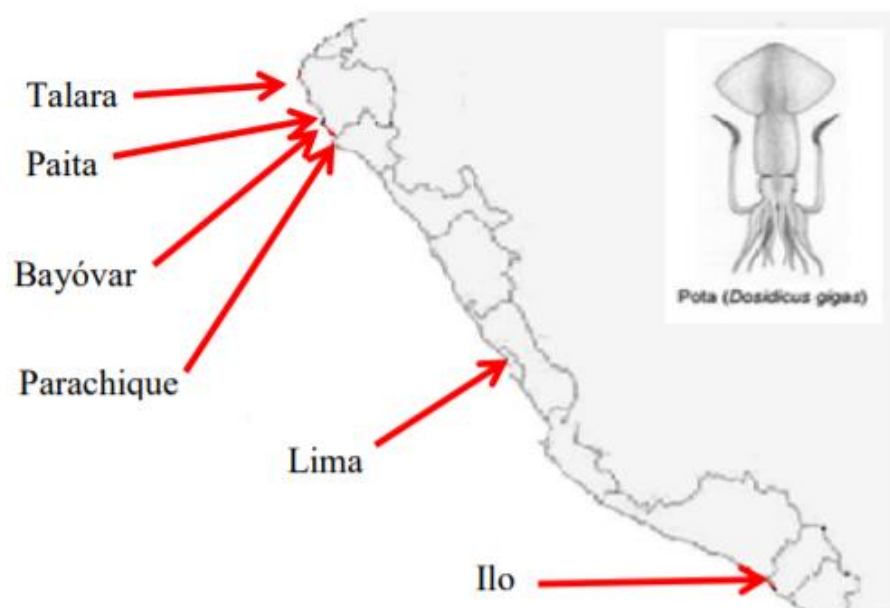


Source:Tennesen, M. (2015)

This squid is a subtropical species, so it visits tropical waters. Its range of distribution is oceanic and neritic, presenting vertical and horizontal migrations of regular distances due to feeding and reproduction processes; in its horizontal migrations it can travel up to 100 kilometers in a period of 3 to 4 days.

The distribution of this species is associated with the pelagic resources of the west coast of America, such as the Peruvian anchovy (Chile and Peru), the Californian anchovy on the west coast of Baja California, the sardine and mackerel in the Gulf of California.

The area between Paita and Cabo Blanco, in front of Punta Sal and Zorritos, is the one with the highest concentration of squid on the Peruvian coast. Another area of considerable concentration of this resource was observed in Punta Falsa, 75 nautical miles from the coast.



Distribución de la pota en la costa peruana
Fuente: Sueiro & De la Puente (2013)

Squid schools can be found from 3 to 270 meters high, they present a different behavior during the day and at night. During the day the highest concentrations were recorded between 180 and 190 meters and during the night, in periods of the last quarter and new moon, between 30 and 50 meters deep. The luminous stimulus of the lamps causes the shoals to rise up to 10 and 30 meters deep. The giant squid is a species found in both oceanic and neritic waters, with a vertical distribution that ranges from the surface to 500 meters deep. It is more abundant along the coast of South America, where specimens have been found in waters at temperatures between 26 and 28°C. The fishing operations of national and foreign vessels must be carried out outside the 80 nautical miles of the coastline. There is no established fishing season for the fishery and there is no minimum catch size.

The first records of official catches of squid in Peru date from 1964, which were made by trawlers. However, it was only at the beginning of the year 1990 that, after explorations carried out by the Institute of the Sea of Peru (Imarpe), a commercial fishing began. In the last 30 years, more than 7'800,000 tons of squid have been landed in Peru (Infopes, 2020).

COMPOSITION AND NUTRITIONAL VALUES

Squid meat is rich in protein similar to white meat fish. In its composition are all the essential amino acids; In addition, it has a high content of polyunsaturated fatty acids. The fresh mantle of the squid is characterized by having an acceptable protein content and being low in fat.

Physical composition of the squid

| Component | % |
|--------------|------|
| Body or tube | 49.3 |
| Fins | 13.4 |
| Tentacles | 21.4 |
| Viscera | 15.4 |

Source: IMARPE

The squid has an appreciable content of mineral salts such as sodium, potassium, calcium and magnesium, as well as lipids rich in polyunsaturated fatty acids.

Main nutritional components of squid

| Component | % |
|------------------|------|
| Humidity | 81.1 |
| Fat | 1.1 |
| Proteins | 16 |
| Mineral salts | 1.7 |
| Calories (100 g) | 101 |

Source: IMARPE

EXPORTABLE OFFER

Through Ministerial Resolution No. 00097-2021-PRODUCE published in the official gazette “El Peruano” on March 25, 2021, the catch quota for the giant squid (*Dosidicus gigas*) resource is established for the period of the year 2021 in five hundred eighty thousand (580,000) tons. This catch quota constitutes the maximum catch limit for the giant squid or squid (*Dosidicus gigas*) and may be modified according to the evolution of biological-fishing and / or environmental factors, following a report from the Institute of the Sea of Peru - IMARPE. The Ministry of Production will terminate the extractive activities of the giant squid or squid (*Dosidicus gigas*), when the catch quota for said resource is reached or when the quota established in article 1 of this Ministerial Resolution is reached or failing that, the extractive activities will end on December 31, 2021.

<https://busquedas.elperuano.pe/normaslegales/establecen-cuota-de-captura-del-recurso-calamar-gigante-o-po-resolucion-ministerial-no-00097-2021-produce-1937991-1/>).



Fuente: IMARPE

In Peru, IMARPE estimated squid biomass in a range of 2.51 to 2.96 million metric tons during the period 2001-2011; However, the results of the acoustic surveys show biomass for squid between 0.38-2.34 million metric tons. Most of the squid biomass is concentrated between 20 and 70mn from the coast, leaving less than 25% of the biomass between 80mn from the coast and the limit of Peruvian jurisdictional waters. Although females tend to mature to larger sizes, three groups of reproductive individuals have been described within their range of distribution:

- Small individuals present in equatorial areas [Coat length (ML): 13-26cm in males and 14-34cm in females];
- Medium individuals present throughout the entire distribution of the species [ML: 24-42cm in males and 28-60cm in females];
- Large individuals present in the northern and southern limits of their distribution and off the Peruvian coast [ML: 40-120cm in males and 55-120cm in females].

The squid has historically been the third most captured species of the group of cephalopods, becoming the main species of cephalopod landed worldwide from the year 2000, concentrating 24% of world landings.

The squid is harvested almost all year round, it does not have reproductive closures, but it occurs with greater abundance in the months of March to June, the squid biomass extends throughout the entire South Pacific, mainly on the coasts of Peru and to a lesser extent in Chile.

According to the Ministry of Production, at the national level, catching squid constitutes the second most important fishing activity in Peru, both in volume and exported value.

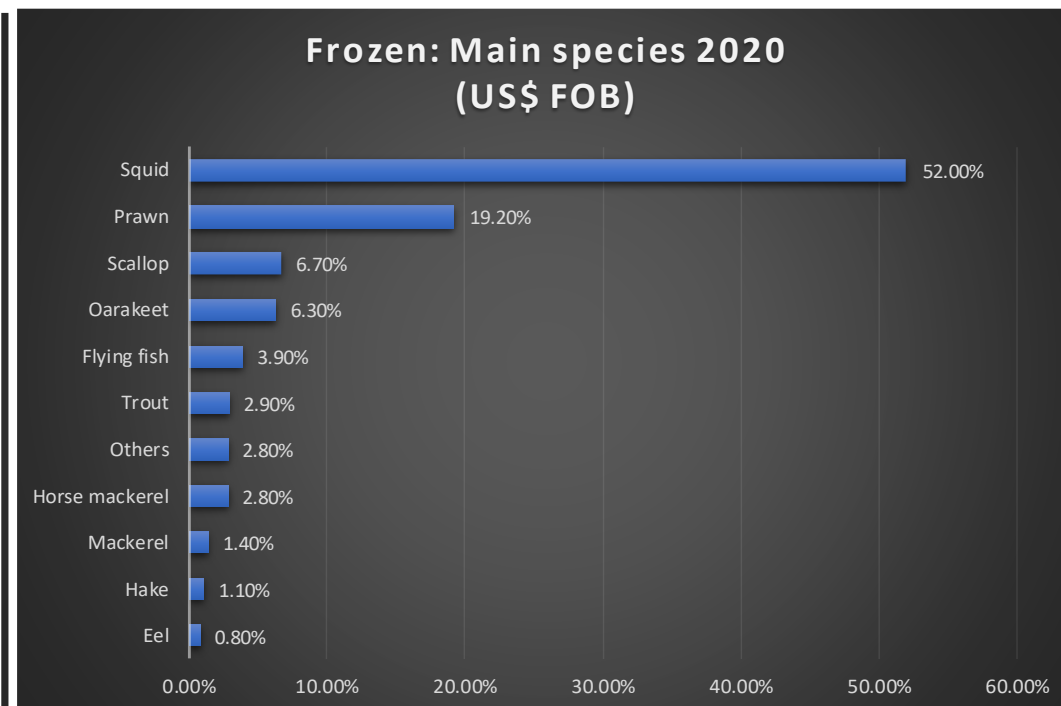
According to the Ministry of Foreign Trade and Tourism (Mincetur), squid is the main Peruvian export product of the non-traditional fishing sector (52% participation). According to ROSPA 41 (WEEKLY OCCURRENCE REPORT OF ARTISANAL FISHING ACTIVITY ON THE PERUVIAN COAST) from the week of October 04 to 10, 2021 prepared by IMARPE, of the 5,875 tons of artisanal fishing from the entire coastline, the group of invertebrates presented the higher landing volumes with 59.4% of the total, of which squid represented 33.8%; that is, 1,180 tons of squid landed. These squid landings occurred in the northern ports, mainly Paita (73.5%), Parachique (8.9%) and Puerto Rico (11.9%); and in the downtown area in Pucusana (2.0%).

During that week of analysis, the main fishing areas for squid were located off the north, from Punta Aguja to Nac beach (Piura), between 11 and 21 nautical miles from the coast. Also, in the central zone in front of the Lima region, from Callao to Pucusana, between 43 and 59 nautical miles.

([http://www.imarpe.pe/imarpe/archivos/reportes/imarpe_rospe_41_\(del_04_al_10-10-2021\).pdf](http://www.imarpe.pe/imarpe/archivos/reportes/imarpe_rospe_41_(del_04_al_10-10-2021).pdf)).

MAIN PRESENTATIONS AND FORMS OF CONSUMPTION

Exports of the frozen line represented 89.8% of the total food destined for direct human consumption. Of this amount, squid derived products obtain a total participation of 52%, notably being the benchmark for industrial processing for human consumption in Peru.



Source: PROMPERÚ

Of the various presentations of squid, raw tentacles, precooked fillet and raw fillets are the presentations with the highest export levels. More than 290 thousand tons of frozen squid were exported. Among the main presentations of squid, we can mention the following:

- **Raw fillet of frozen squid** of which 57,486 tons were exported.



- **Precooked fillet of frozen squid**, with a total of 39,945 tons.



- **Dried fillet of frozen squid**, of which 978 tons were exported.



- **Rings of frozen squid**, with a total of 18,324 tons.



- **Raw tentacles of frozen squid,**with 56,341 tons.



- **Precooked frozen squid tentacle slices,** with 2,695 tons.



- **Raw fins of frozen squid,** with 57,191 tons.



- **Precooked fins of frozen squid**, with a total of 9,919 tons.



- **Napes of frozen squid**, with 26,292 tons exported.



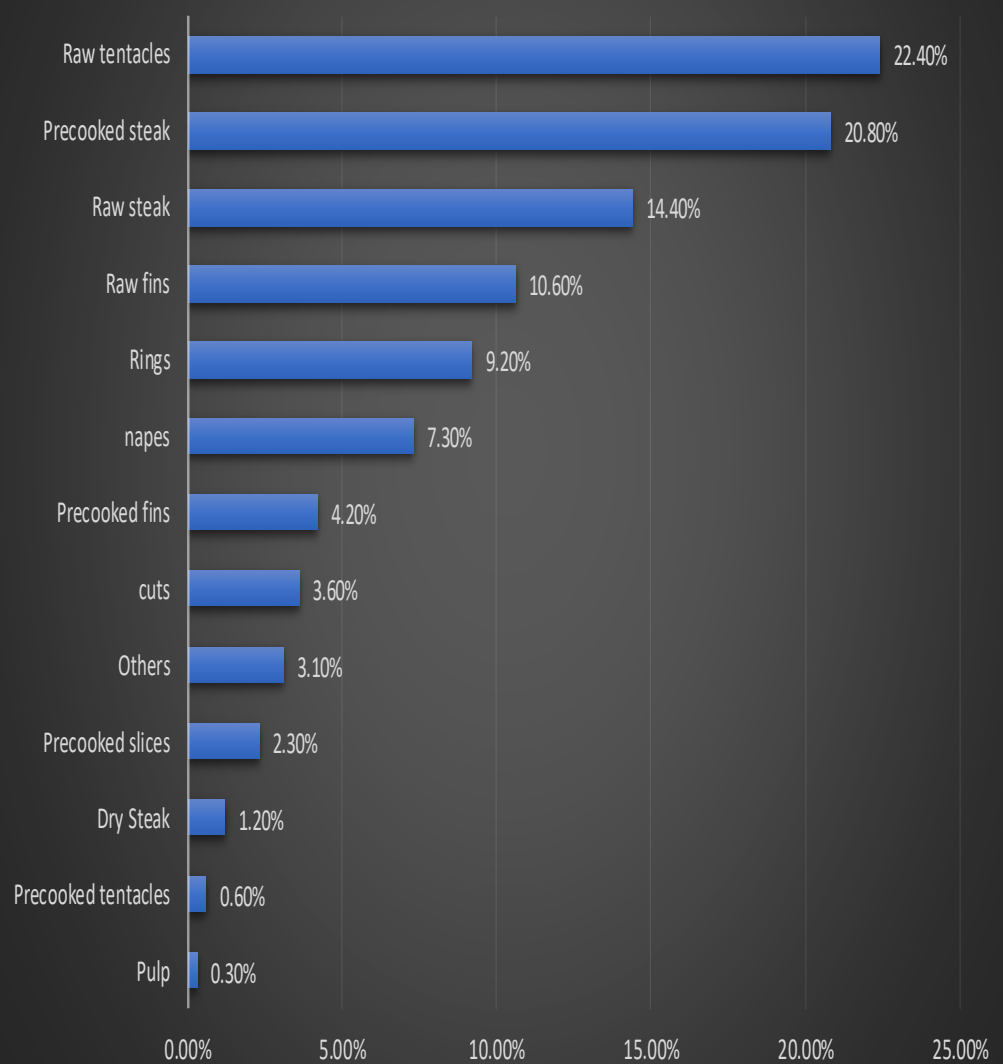
- **Cuttings of frozen squid**, with a total of 17,576 tons.



- **Frozen precooked squid pasta**



Main presentation of frozen squid 2020 (US\$ FOB)



Source: PROMPERÚ

Tentacle:

Squid has 8 tentacles for propulsion and 2 sexual tentacles. they are exported whole or cut into slices.

Approximate weight: 4.41 Lb

Nut

Approximate weight 1.10 Lb

Fin

Use it to dehydrate it industrially or consumed it chopped. It is exported in blocks of 22.04 Lb.

Approximate weight 4.41 Lb

Mantle

With the mantle they make Raw or Cooked Fillet (Daruma), Rings, Squids and Tablets.

Approximate weight: 8.82 Lb

