

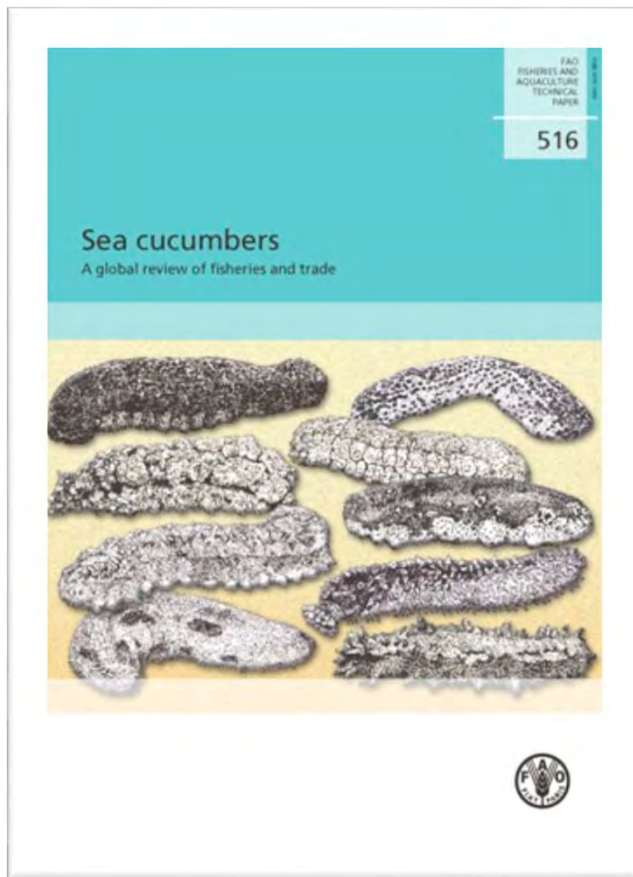


Taller sobre pez león y pepino de mar
La Habana, Cuba

Visión del Mercado Mundial para los Pepinos de Mar
un punto de vista latinoamericano y caribeño

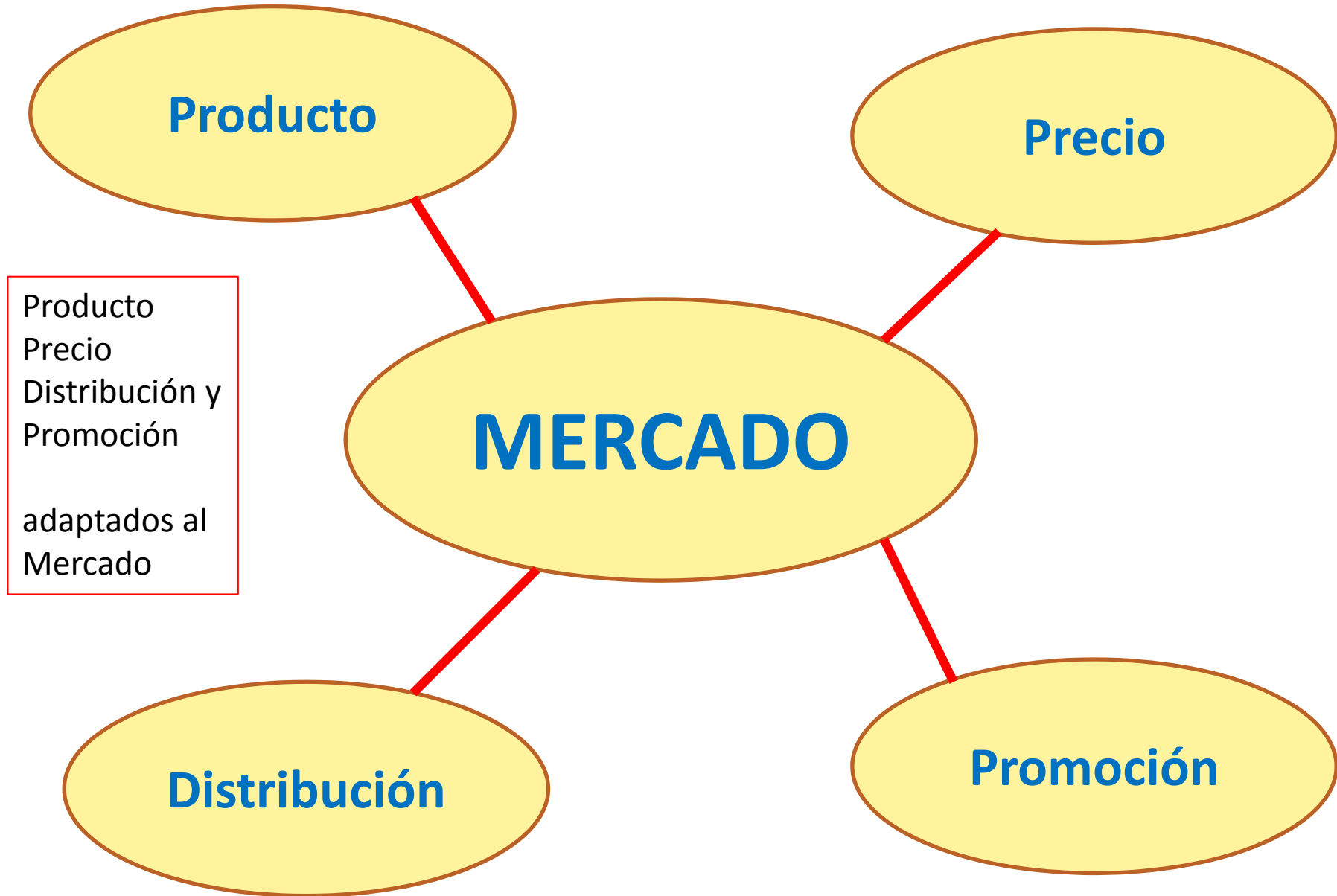


Roland Wiefels
30 de Abril de 2014



Ya existe una excelente literatura sobre pepinos de mar, abordando el asunto con diversos puntos de vista: biológico, ecosistémico, geográfico, oceanográfico...

El punto de vista de la Comercialización



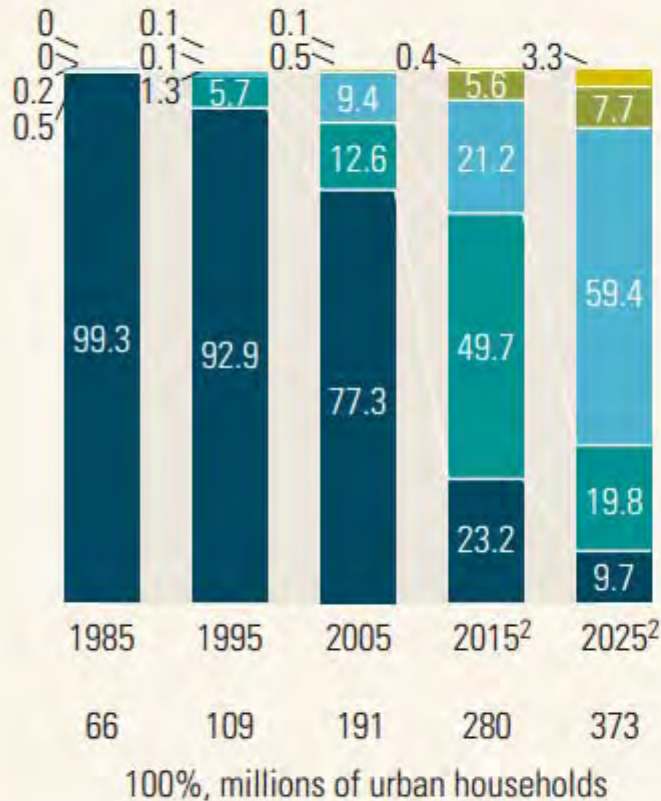
El Mercado



China : Principal Mercado

Spending power is on the rise

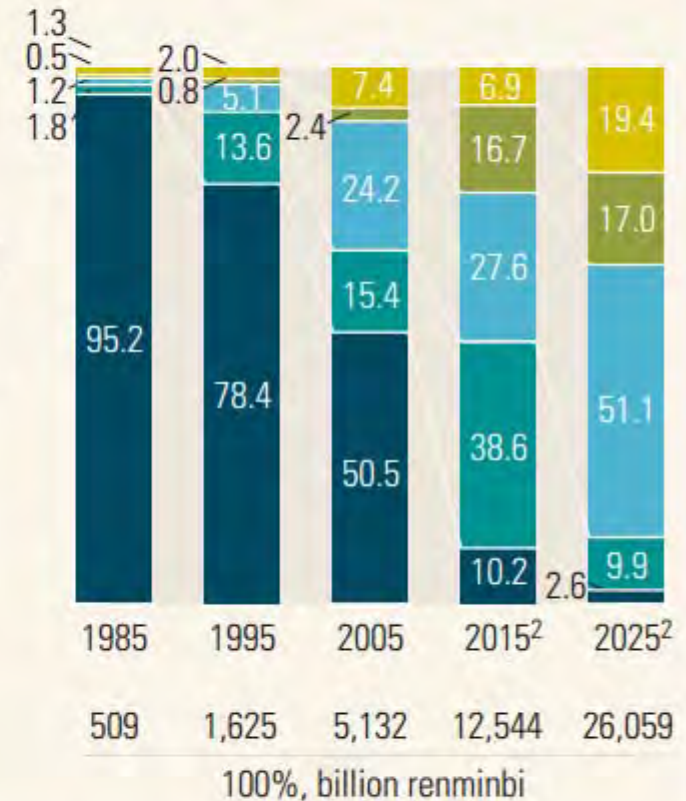
Share of Chinese urban households,¹ %



Segments by annual income

- Global affluent**
(>200,000 renminbi)
USD 2667 / mes
- Mass affluent**
(100,001–200,000 renminbi)
USD 1333 – USD 2667/mes
- Upper middle class**
(40,001–100,000 renminbi)
USD 533 – USD 1333 / mes
- Lower middle class**
(25,001–40,000 renminbi)
USD 333 – USD 533 / mes
- Poor** (≤25,000 renminbi)
USD 333 / mes

Share of total urban disposable income,¹ %



¹Some figures do not sum to 100%, because of rounding; disposable income = after-tax income, including savings; real renminbi, base year = 2000; 1 renminbi = \$0.12.

²Base case forecast, Q1 2006.

Source: National Bureau of Statistics of China; McKinsey Global Institute analysis

What will urban Chinese consumers buy?

For urban China (real renminbi, base year = 2000)

| Product category | Projected change in absolute consumption, billion renminbi ¹ | Absolute growth, 2004–25, billion renminbi ¹ | Projected compound annual growth rate, 2004–25, ¹ % |
|-------------------------------|---|---|---|
| Food ² |  1,223 4,786 | 3,562 |  6.7 |
| Recreation, education |  507 3,415 | 2,908 |  9.5 |
| Transportation, communication |  452 2,920 | 2,468 |  9.3 |
| Apparel |  369 1,322 | 953 |  6.3 |
| Housing, utilities |  321 3,313 | 2,992 |  11.8 |
| Health care |  257 2,582 | 2,325 |  11.6 |
| Household products |  223 857 | 634 |  6.6 |
| Personal products |  119 771 | 652 |  9.3 |

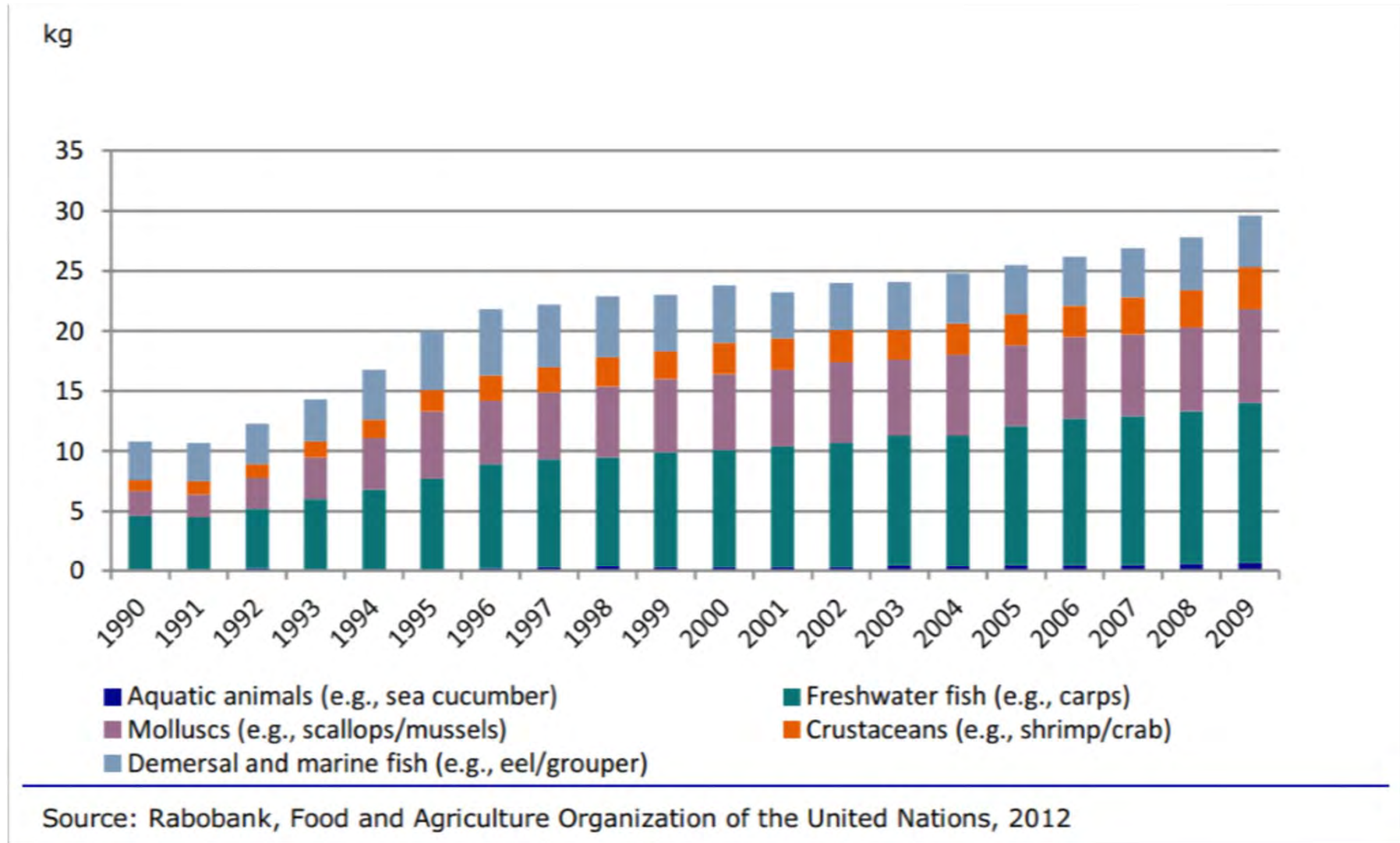


¹Base case forecast, Q1 2006; 1 renminbi = \$0.12.

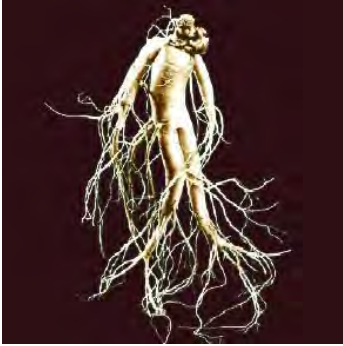
²Figures do not sum to total, because of rounding.

Source: National Bureau of Statistics of China; McKinsey Global Institute analysis

Evolución del consumo anual *per capita* de productos pesqueros y acuícolas en China



Panax ginseng



人參

(rén shen)

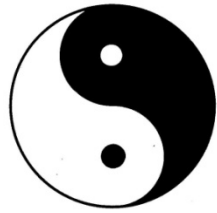
= Raíz vegetal (con forma) humana

Pepino de mar:

海參

(hai shen)

≈ ginseng del mar



Filosofía Yin – Yang en Alimentación, Salud y Medicina:



De acuerdo con los principios y teoría de la medicina china tradicional, el pepino de mar:

- Alimenta la sangre, esencia vital (jing)
- Alimenta los riñones (qi) evitando enfermedades de riñones y del sistema reproductivo
- Reduce la sequedad (en particular de los intestinos)
- Tiene una calidad salada y una naturaleza caliente
- Es usada para tratar debilidad, impotencia, flaqueza de ancianos, constipación debida a sequedad intestinal, y orina frecuente

“Trate primero la enfermedad con alimento. Solo se eso no funciona es que se debe prescribir medicación”

Sun Simiao – medico de la corte, dinastía Tang



Ya el Ginseng:

Combate el stress

Aumenta la inmunidad

Mejora la memoria

Lucha contra el envejecimiento

Aumenta la libido



ZHENXIANG DONG

*Los Chefs chinos:
importantes
formadores de opinión*



Profesor de las mejores cocinas del país:

Da Dong - "Dong el grande" - es, en realidad, Zhenxiang Dong, vicepresidente de la China Master Chef Association, especialista en algunas de las cocinas más emblemáticas de China - como las de Cantón, Shandong, Sichuan y Huaiyang - y cabeza visible de uno de los restaurantes que avanzan en la búsqueda de nuevos caminos para una cocina milenaria.

GRAN IMPORTANCIA DE LOS PRODUCTOS EN SU OBJETIVO DE SALUD:

No es más que el principio de un recorrido que se adentra en terrenos marcados por el producto: pepinos de mar guisados (el cohombro del que se extrae la espardeña), o pepino y aletas de tiburón en caldo de azafrán. El azafrán apenas se utiliza en la cocina, pero tiene un notable prestigio medicinal y su presencia en el plato es un síntoma del empeño de Da Dong por buscar una cocina íntimamente preocupada por la salud.



Efectos estacionales en el consumo



年年有余

春节 = Festival de Primavera
Chun Jie (Año Nuevo Chino)

Fish=鱼 (by meaning)
鱼=余 (by pronunciation)
余=surplus, extra, abundance

J R Liu 2013/9/23

Dates for Chinese Traditional Festivals (2008-2015)

| | Spring (New Year) | Lantern | Azure Dragon | Shangsi | Qing Ming | Dragon Boat | Double Seventh | Ghost | Mid-Autumn | Double Ninth | Water Lantern | Winter | Laba |
|------|-------------------|---------|--------------|---------|-----------|-------------|----------------|--------|------------|--------------|---------------|--------|---------|
| 2008 | Feb 7 | Feb 21 | Mar 9 | Apr 8 | Apr 4 | Jun 9 | Aug 7 | Aug 15 | Sep 14 | Oct 7 | Nov 12 | Dec 4 | Jan 3* |
| 2009 | Jan 26 | Feb 9 | Feb 26 | Mar 29 | Apr 4 | May 28 | Aug 26 | Sep 3 | Oct 3 | Oct 26 | Dec 1 | Dec 22 | Jan 22* |
| 2010 | Feb 14 | Feb 28 | Mar 17 | Apr 16 | Apr 5 | Jun 16 | Aug 16 | Aug 24 | Sep 22 | Oct 16 | Nov 20 | Dec 12 | Jan 11* |
| 2011 | Feb 3 | Feb 17 | Mar 6 | Apr 5 | Apr 5 | Jun 6 | Aug 6 | Aug 14 | Sep 12 | Oct 5 | Nov 10 | Dec 1 | Jan 1* |
| 2012 | Jan 23 | Feb 6 | Feb 23 | Mar 24 | Apr 4 | Jun 23 | Aug 23 | Aug 31 | Sep 30 | Oct 23 | Nov 28 | Dec 21 | Jan 19* |
| 2013 | Feb 10 | Feb 24 | Mar 13 | Apr 12 | Apr 4 | Jun 12 | Aug 13 | Aug 21 | Sep 19 | Oct 13 | Nov 17 | Dec 9 | Jan 8* |
| 2014 | Jan 31 | Feb 14 | Mar 2 | Apr 2 | Apr 5 | Jun 2 | Aug 2 | Aug 10 | Sep 8 | Oct 2 | Dec 6 | Dec 28 | Jan 27* |
| 2015 | Feb 19 | Mar 5 | Mar 21 | Apr 21 | Apr 5 | Jun 20 | Aug 20 | Aug 28 | Sep 27 | Oct 21 | Nov 26 | Dec 17 | Jan 17* |

Diáspora China en el Mundo: 40 millones de Chinos y descendientes

| | | | |
|----------------|-------------------|----------------|------------------|
| Asia | 30.976.784 | | |
| Indonesia | 7.500.000 | | |
| Malasia | 7.100.000 | | |
| Tailandia | 7.000.000 | | |
| Singapur | 2.770.300 | | |
| Vietnam | 1.200.000 | | |
| Filipinas | 1.100.000 | | |
| Birmania | 1.100.000 | | |
| Japón | 655.377 | | |
| Corea del Sur | 624.994 | | |
| | | América | 6.059.240 |
| | | Estados Unidos | 3.500.000 |
| | | Canadá | 1.300.000 |
| | | Perú | 1.300.000 |
| | | Europa | 1.700.000 |
| | | Rusia | 998.000 |
| | | Francia | 630.515 |
| | | Reino Unido | 500.000 |
| | | Italia | 209.934 |
| | | España | 128.022 |
| | | Países Bajos | 114.928 |
| | | Alemania | 71.639 |
| | | África | 500.000 |
| | | Sudáfrica | 350.000 |
| | | Angola | 100.000 |
| Oceanía | 1.000.000 | | |
| Australia | 669.896 | | |
| Nueva Zelanda | 147.570 | | |



Hay 2020 Chifas en Lima Metropolitana, Perú



Londres Inglaterra



Potsdam, Alemania



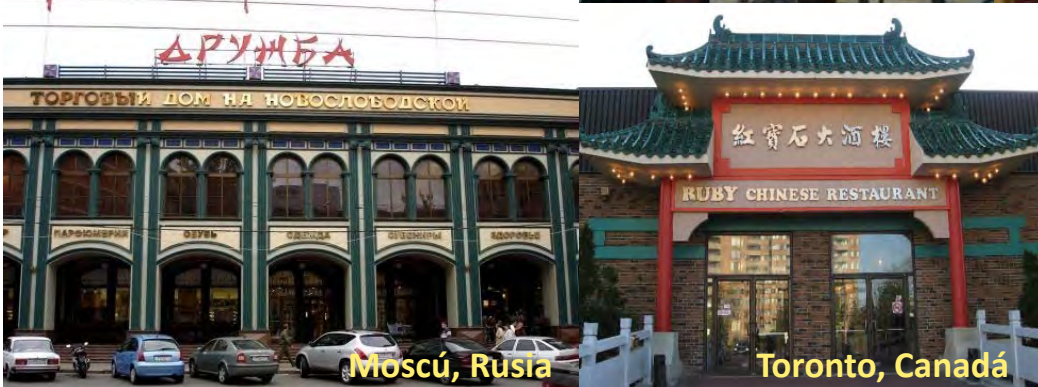
Midlothian, IL, USA



Cary, NC, USA



Paris, Francia



Moscú, Rusia

Toronto, Canadá

Nichos de mercado:
Restaurantes Chinos del Mundo

2014



ASIA'S LARGEST SEAFOOD SHOW • NOW IN ITS 19th YEAR!
Qingdao International Convention Center, Qingdao, China
NOVEMBER 5-7, 2014



De 02 a 04 de Setiembre 2014

*Para conocerlo,
i Hay que irse hacia el Mercado !*

ASIAN SEAFOOD EXPOSITION 2014



Seafood Expo
ASIA



FORMERLY ASIAN SEAFOOD EXPOSITION

Los Productos y los Precios

FAO Species Catalogue for Fishery Purposes No. 6

ISSN 1020-8682



COMMERCIALLY IMPORTANT SEA CUCUMBERS OF THE WORLD



FAO Species Catalogue for Fishery Purposes No. 6

FIR/CAT. 6



COMMERCIALLY IMPORTANT SEA CUCUMBERS OF THE WORLD

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome, 2012

Apostichopus japonicus (Selenka, 1867)

Aspidochirotida: Stichopodidae

EXPLOITATION:

Fisheries: This species is fished on an industrial scale, by SCUBA or hookah divers, or by drag nets trawled behind larger boats. It is the most important commercial species in Northeast Asia and has the longest history of exploitation in the Far East (Russian Federation, China, Japan, Republic of Korea and Democratic People's Republic of Korea). China produces about 4 000 tonnes (dried) of *A. japonicus* from aquaculture per year to supply local demand. Japan has the highest fishery captures of this species.

Regulations: In China, exploitation of this species is regulated by fishing permits. Japan has set aside certain localities as breeding reserves where sea cucumber fishing is strictly prohibited, fishing is prohibited during the spawning season from 1 May to 15 June, with a minimum legal weight limit of 130 g.

Human consumption: Consumed either as bêche-de-mer, its intestines (konowata) and dried gonads (kuchiko) are eaten as delicacies, or it is eaten raw with sauce. It is commonly used in traditional medicine.

Main market and value: The majority of harvested animals are destined for domestic consumption. It is sold at USD2–3 per unit fresh, USD120–130 kg⁻¹ in brine and up to USD400–500 kg⁻¹ dried. Prices in Hong Kong China SAR retail markets ranged from USD970 to 2 950 kg⁻¹ dried.



LIVE (photo by: A. Semenov)



PROCESSED (photo by: S.W. Purcell)



GEOGRAPHICAL DISTRIBUTION:

Distributed mainly in the western Pacific Ocean, the Yellow Sea, the Sea of Japan, the Sea of Okhotsk. The northern limits of its geographic distribution are the coasts of Sakhalin Island, Russian Federation and Alaska (USA). The southern limit is Tanega-shima in Japan. In China, it is commonly distributed on the coast of Liaoning, Hebei and Shandong Province, Yantai and Qingdao of Shandong Province. Its southern limit in China is Dalian Island in Lian Yungang, Jiangsu Province.

La especie más demandada por el principal mercado no es encontrada en América Latina y el Caribe

Astichopus multifidus (Sluiter, 1910)

Aspidochirotida: Stichopodidae

EXPLOITATION:

Fisheries: *Astichopus multifidus* is harvested by SCUBA and hookah diving. There is an artisanal fishery in Panama, where this species is one of three most important species in the commercial catches, although in low numbers. In 1997, fishing in the Bocas del Toro region (Panama) seriously affected populations of *A. multifidus*. This species was absent in 95% of the protected areas around Cayo Zapatillas (Panama), which suggests that the local peoples may have overexploited this species from the marine park. It is commonly part of multispecies fisheries that include *I. badionotus* and *H. mexicana*.

Regulations: There is a complete fishing ban in Panama as of 2003.

Human consumption: Mostly, the reconstituted body wall (bêche-de-mer) is consumed by Asians.

Main market and value: The main market is China. Market value not determined.



LIVE (photo by: F. Charpin)



GEOGRAPHICAL DISTRIBUTION:

It can be found in the Caribbean Region, including Florida (USA), the Bahamas, Panama.

Isostichopus badionotus (Selenka, 1867)

Aspidochirotida: Stichopodidae

EXPLOITATION:

Fisheries: In the Caribbean, it is one of the most important commercial species. This species is collected in artisanal and semi-industrial fisheries. It is fished commercially in Cuba, Nicaragua and Venezuela (Bolivarian Republic of). This has been the only species fished in Cuba since 1999 despite the availability of other species. In Colombia, there is an illegal, unregulated and non-quantified fishery for this species, and it is of potential commercial interest in Florida (USA), Puerto Rico and the United States Virgin Islands.

Regulations: In Cuba, the fishery is managed through a minimum legal length of 24 cm (or 22 cm ventrally), a fishing season between 1 June and 31 October, it is only open to artisanal fishers and there are no-take reserves. In Cuba, landings are closely monitored and compared with data on sale and exports; there is only one export company and logbooks must be submitted prior to shipments.

Human consumption: Mostly, the reconstituted body wall (bêche-de-mer) is consumed by Asians. It is occasionally consumed locally for medicinal purposes.

Main market and value: Hong Kong China SAR. It is sold by fishers in the Caribbean at USD22 kg⁻¹ salted. Some salted product is processed to dried form in Chinese processing plants. Prices in Hong Kong China SAR retail markets ranged from USD203 to 402 kg⁻¹ dried.



LIVE (photo by: E. Ortiz)



PROCESSED (photo by: S.W. Purcell)



GEOGRAPHICAL DISTRIBUTION:

Widely distributed throughout the Caribbean Sea, from subtropical Atlantic, Brazil, Venezuela (Bolivarian Republic of), Colombia, Panama, Yucatan (Mexico) to southern Florida and the Bahamas also in South Carolina (USA), the Mid Atlantic at Ascension Island, in the Gulf of Guinea off Western Africa.

Holothuria kefersteini (Selenka, 1867)

Aspidochirotida: Holothuriidae

HABITAT AND BIOLOGY: In El Salvador, this species appears to prefer rocky shores. In the Galapagos Islands, it can be found in the intertidal and subtidal zone, generally exposed on coral sand bottoms. It is often the most common species on sandy bottoms. It can be found to a maximum depth of 18 m. Reproductive biology is unknown.



LIVE (photo by: G. Edgar)

EXPLOITATION:

Fisheries: This species is fished artisanally. It is exploited illegally in the Galapagos Islands, El Salvador and Mexico, where it is reported to be severely over-exploited. In the Galapagos Islands, it is harvested by hand collecting using hookah diving. In El Salvador, it is part of a multispecies fishery, which probably includes *Isostichopus fuscus*.

Regulations: All species of holothurians in El Salvador are listed under the Endangered Species list of the Ministry of Environment.

Human consumption: Mostly, the reconstituted body wall (bêche-de-mer) is consumed by Asians.

Main market and value: Retail prices in Hong Kong China SAR were up to USD126 kg⁻¹ dried.



PROCESSED (photo by: S.W. Purcell)



GEOGRAPHICAL DISTRIBUTION:

Gulf of Baja California, Baja, Central America, Colombia, Ecuador and Peru and the oceanic islands of Revillagigedos, Galapagos Islands, Cocos Island and Malpelo.

Holothuria mexicana Ludwig, 1875

Aspidochirotida: Holothuriidae

HABITAT AND BIOLOGY: In Colombia, this species prefers coral reefs, seagrass beds, sandy or rubble bottoms and mangrove habitats. In the wider Caribbean, it inhabits shallow waters with sandy or coral patches or seagrass beds.

In Panama, it reproduces between February and July, and late summer in southern Florida (USA). However, there are individuals with mature gametes all year long. This species has a size-at-maturity of 18 cm. On Curaçao reefs, it mostly spawns within the first five days following the full moon between August and October.



LIVE (photo by: SIMAC-INVEMAR)

EXPLOITATION:

Fisheries: Harvested by hand collection in artisanal fisheries in the Gulf of Mexico and Caribbean, often illegally. This species is part of multispecies fisheries that often include *H. floridana*, *H. thomasi*, *Astichopus multifidus* and *Isostichopus badionotus*.

Regulations: Where it is fished, there are few, or no, regulations pertaining to harvesting, apart from no-take marine reserves.

Human consumption: Mostly, the reconstituted body wall (bêche-de-mer) is consumed by Asians.

Main market and value: Asian markets. Prices in Hong Kong China SAR retail markets ranged from USD64 to 106 kg⁻¹.



PROCESSED (photo by: F.A. Solis-Marin)



GEOGRAPHICAL DISTRIBUTION:

Distributed widely along the Florida Keys, Bahama Islands, Cuba, Puerto Rico, Jamaica, Barbados, Tobago, Aruba, Yucatan Peninsula, Belize, Bonaire, Venezuela (Bolivarian Republic of) and islands off Colombia, at depths from 0.5 to 20 m.

Holothuria atra Jaeger, 1833

EXPLOITATION:

Fisheries: Fished artisanally (e.g. Viet Nam, Kiribati), semi-industrially (Mauritius), and industrially (Egypt). Harvested by hand collecting, free-diving, hookah diving, and SCUBA diving. It is, or has previously been, harvested in at least 20 countries and islands States in the western central Pacific. Harvested for subsistence in Guam, Nauru, Samoa, Cook Islands, Niue and French Polynesia. It is of commercial importance in China, Japan, Malaysia, Thailand, Indonesia, the Philippines and Viet Nam. Commercially important in Tanzania, Mauritius and Eritrea. There is some harvesting of this species in Sri Lanka, Egypt, Madagascar, Mozambique and Seychelles. In the Galápagos Islands (Ecuador), it is fished illegally.

Regulations: Before a fishery moratorium in Papua New Guinea, fishing for this species was regulated by minimum landing size limits (30 cm live; 15 cm dry) and other regulations. Although seldom fished in Australia, a minimum live size limit is set at 15 cm in Torres Strait, the Northern Territory and Western Australia, and 20 cm on the Great Barrier Reef. In Maldives, the minimum live size limit of this species is 15 cm.

Human consumption: In few Pacific Island nations, the body wall, intestines and/or gonads are consumed in traditional diets or in times of hardship. More often, it is dried and exported for consumption, predominantly by Asians.

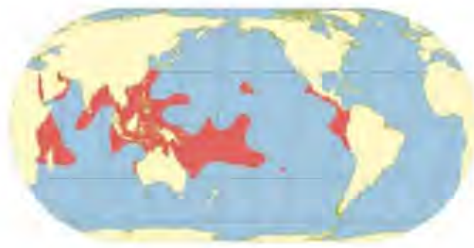
Main market and value: China and Hong Kong China SAR. Ho Chi Minh City in Viet Nam for further export to the Chinese market. It has been traded at USD4–20 kg⁻¹ dried in the Philippines. In Papua New Guinea it was previously sold at USD2.5 kg⁻¹ dried. In Fiji, fishers receive USD0.6–1.4 kg⁻¹ fresh gutted. Retail prices in Hong Kong China SAR were up to USD210 kg⁻¹. Wholesale prices in Guangzhou were up to USD63 kg⁻¹ dried.



LIVE (photo by: S.W. Purcell)



PROCESSED (photo by: S.W. Purcell)



GEOGRAPHICAL DISTRIBUTION:

Widespread in the Indo-Pacific. This species is found at Mascarene Islands, East Africa, Madagascar, Red Sea, southeast Arabia, Persian Gulf, Maldives, Sri Lanka, Bay of Bengal, India, North Australia, the Philippines, China and southern Japan, South Sea Islands, Hawaiian Islands. It can be found in the islands in the central and eastern tropical Pacific, including Coco and Galápagos islands, Panama region, Clipperton Island and Mexico.

Isostichopus fuscus (Ludwig, 1875)

Aspidochirotida: Stichopodidae

EXPLOITATION:

Fisheries: *I. fuscus* is harvested in semi-industrial fisheries by hookah diving. This species is under commercial exploitation in Ecuador, Mexico, Panama and Peru. In Panama, it is fished illegally. In the Galapagos Islands, there was a moratorium on fishing in 2009 and 2010 as the minimum population density required to open the fishery (11 ind. 100 m²) was not met. At mainland Ecuador, the fishery started in 1988 and fishers serially deplete the fishing grounds. The fishery in Mexico, Central and South America started after the depletion of sea cucumbers in traditional fishing grounds.

Regulations: In the Galapagos Islands, this fishery is managed by means of a TAC, minimum legal length (20 cm fresh or 7 cm dry), no-take reserves, a fishing season (two months), and access is only to artisanal fishers that are permanent residents of the islands. In Mexico, there is a fishing season (October–May), a minimum legal size (400 g or 20 cm) and annual permits. Additionally, no-take reserves are established where the smallest individuals are found. There is a total ban on fishing *I. fuscus* in continental Ecuador. In Mexico, adaptive management includes quotas, catch reports and stock monitoring. This species is the only commercially exploited sea cucumber, so far, that is listed in CITES Appendix III.

Human consumption: The reconstituted body wall (bêche-de-mer) is consumed by Asians.

Main market and value: Hong Kong China SAR and the United States of America. It is sold at USD1.4 per unit fresh.



LIVE (photo by: S.W. Purcell)



PROCESSED (photo by: S.W. Purcell)



GEOGRAPHICAL DISTRIBUTION:

Found from Baja California to mainland Ecuador, including Galapagos, Socorro Island, Cocos (Keeling) Islands, Malpelo and Revillagigedo islands. Hooker, Solís-Marín and Leellish (2005) include Peru (Islas de Lobos de Afuera) in its geographical distribution.

Holothuria impatiens (Forsskål, 1775)

Aspidochirotida: Holothuriidae

EXPLOITATION:

Fisheries: This species is harvested in artisanal fisheries, by hand collection in shallow waters. It is harvested by hookah diving in south Viet Nam. In the western central Pacific it does not have a commercial value, so it is unexploited in that region. It has commercial importance in China and Indonesia and Mexico. In Madagascar, there is limited harvesting.

Regulations: None.

Human consumption: Mostly, the reconstituted body wall (bêche-de-mer) is consumed by Asians.

Main market and value: This is a low-value species, principally exported to Chinese markets. It has been traded recently at about USD2 kg⁻¹ dried in the Philippines.



LIVE (photo by: S. Ribes)



GEOGRAPHICAL DISTRIBUTION:

It can be found from East Africa and the Indian Ocean to the western central Pacific including Hawaii, in the Pitcairn Islands group, and including much of the Pacific coast of Central America.

Parastichopus californicus (Stimpson, 1857)

Aspidochirotida: Stichopodidae

EXPLOITATION:

Fisheries: *Parastichopus californicus* is exploited in industrial fisheries by hand collection by SCUBA diving and by trawling. The fishery of this species in Washington (USA) started in the 1970s, later spreading to California, Alaska and Oregon. In British Columbia (Canada), the first official landings date back to 1980. It is the only commercially harvested species on the west coast of Canada (Vancouver Island, Georgia and Johnstone Straits and Pudget Sound). Until 1997, an average of 75% of the annual catch was from the southern California trawl fishery. In Alaska (USA), *P. californicus* is one of the main species harvested for subsistence in native communities.

Regulations: In Canada, the fishery is managed by means of a fishing season (October and November), limited number of licences, no-take marine reserves, TACs, and individual transferable quotas (ITQs). In California, exploitation of this species is regulated by permits for each gear type and limited entry restrictions, but there is no TAC regulation. Trawling is prohibited in some conservation areas. There are no-take marine reserves to protect breeding populations.

Human consumption: Mostly, the reconstituted body wall (bêche-de-mer) is consumed by Asians. The muscle strips of this species are also exported and consumed.

Main market and value: The main markets are Hong Kong China SAR, Taiwan Province of China, Mainland China and the Republic of Korea. It is sold by fishers for up to about USD3.70 kg⁻¹ wet (gutted).



LIVE (photo by: J.M. Watanabe)



PROCESSED (photo by: J. Akamine)



GEOGRAPHICAL DISTRIBUTION:

Distributed along the Pacific coast of North America, from the Aleutians Islands, Alaska to the Gulf of California.

Holothuria leucospilota Brandt, 1835

Aspidochirotida: Holothuriidae

This species attains size-at-maturity at 180 g and sexual reproduction occurs bi-annually, during the dry season. Smaller individuals may reproduce asexually by transverse fission. On the Great Barrier Reef (Australia), it reproduces sexually between November and March, while in the Northern Territory (Australia) in April. In the Cook Islands, this species reproduces from October to April. In Taiwan Province of China, it reproduces between June and September. In Réunion, it reproduces sexually twice a year; in February and in May.



LIVE (photo by: S.W. Purcell)

EXPLOITATION:

Fisheries: This species is harvested in artisanal fisheries at localities where low-value species are exploited. Harvested predominantly by hand collection at low tide and by free diving. In the southern Cook Islands, it is exploited for its gonads by women and children, particularly in the summer months. The animals re-grow their organs, so this harvesting is renewable. This species is also fished for subsistence in Samoa and Tonga. In Asia, it is fished in China, Malaysia, Thailand, Indonesia, the Philippines and Viet Nam. In Southeast Asia, it is known to be part of the “worm” sea cucumbers, lower-value higher-volume species. Also fished in Madagascar.

Regulations: Where it is fished, there are few, or no, regulations pertaining to the harvesting of this species.

Human consumption: Mostly, the reconstituted body wall (bêche-de-mer) is consumed by Asians. The whole animal or its intestine and/or gonads may be consumed as a delicacy or as protein in traditional diets or in times of hardship (i.e. following cyclones).

Main market and value: Singapore and Ho Chi Minh City (Viet Nam) for further exports to Chinese markets. In Viet Nam, it is sold for USD1.3 kg⁻¹ dried. It has been traded recently at about USD5 kg⁻¹ dried in the Philippines.



GEOGRAPHICAL DISTRIBUTION:

This species has one of the broadest distributions of all holothurians, and it can be found in most tropical localities in the western central Pacific, Asia and most Indian Ocean regions.

Holothuria pardalis Selenka, 1867

Aspidochirotida: Holothuriidae

HABITAT AND BIOLOGY: In Kenya, it has been observed buried under coral rubble or coral boulders. In the Comoros, it inhabits shallow waters between 0 and 10 m depth on coral rock or buried among coral rubble. In La Réunion, it is found in crevices on reef flats. Its reproductive biology is unknown.



LIVE (photo by: www.noaa.gov)

EXPLOITATION:

Fisheries: It is commercially exploited in China and Indonesia.

Regulations: Not available.

Human consumption: Unknown, probably exported dried and eaten by Asians after being reconstituted.

Main market and value: Not available.



GEOGRAPHICAL DISTRIBUTION:

Ranges from the western central Pacific to the Hawaiian Islands, Asia and the Africa and Indian Ocean region. Also found on the Pacific coast of Central America.

Actinopyga agassizii (Selenka, 1867)

Aspidochirotida: Holothuriidae

EXPLOITATION:

Fisheries: Artisanal fishery. In Nicaragua, this species is harvested, without any regulation, with other sea cucumber species. There is commercial exploitation for bêche-de-mer in Panama and Venezuela (Bolivarian Republic of) however, no recent information is available.

Regulations: In Panama, there is a ban on commercial catches of all sea cucumbers (H. Guzman, personal communication), including *A. agassizii*. There is no management of the fishery in Costa Rica.

Human consumption: Consumed as bêche-de-mer.

Main markets and value: Undetermined.



LIVE (photo by: J.J. Alvarado)



GEOGRAPHICAL DISTRIBUTION:

Caribbean coast of Florida (USA), Cuba, Mexico, Puerto Rico, Dominican Republic, Haiti, Jamaica, Belize, Guatemala, Honduras, Nicaragua, Costa Rica, Panama, Colombia (Atlantic), Venezuela (Bolivarian Republic of), the Bahamas, Barbados and the United States of America.

Holothuria arenicola Semper, 1868

Aspidochirotida: Holothuriidae

HABITAT AND BIOLOGY: Abundant in intertidal and shallow areas but can also be found in deeper waters. It can be found under stones, in coral debris and on sand flats. Specimens have been found buried in *Thalassia* seagrass beds in 3 m of water. In Honduras, it buries in sandy substrata and seagrass beds but it has also been found under rubble and in dead conch shells. This sea cucumber can form conical mounds where it buries. This species ingests surface and subsurface sediments using a funnel that ends 15 to 20 cm below the surface.



LIVE (photo by: A.M. Kerr)



PROCESSED (photo by: S.W. Purcell)

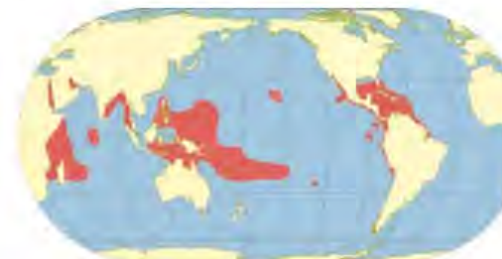
EXPLOITATION:

Fisheries: This species is believed to be fished in China, Madagascar and Egypt. The scale of fishing is mostly artisanal.

Regulations: Management regulations are generally lacking in countries in which it is fished.

Human consumption: Poorly known.

Main market and value: It is a low-value species. Retail prices in Hong Kong China SAR were up to USD2 kg⁻¹ dried.



GEOGRAPHICAL DISTRIBUTION:

This species is believed to be found at some localities in the Western Pacific, parts of Asia, and the Indian Ocean, including the Red Sea and the Comoros. Reported along the Pacific coast of Central America. This species is reported from the Caribbean and Brazil, but those sightings probably represent a different species.

Athyonidium chilensis (Semper, 1868)

Dendrochirotida: Cucumariidae

EXPLOITATION:

Fisheries: This species is harvested artisanally by hookah diving and hand collecting. It is commercially exploited in Peru and Chile. Historical information states that it was traditionally eaten in the Department of Lambayeque (Peru).

Regulations: None.

Human consumption: Mostly, the reconstituted body wall (bêche-de-mer) is consumed by Asians.

Main market and value: The United States of America, China, Mexico, Taiwan Province of China. It is sold at USD10 kg⁻¹ dried.



LIVE (photo by: L. Amaro-Rojas)



PROCESSED (photo by: C. Guisado)



GEOGRAPHICAL DISTRIBUTION:

From Ancon (Peru) 12° 02.3'S; 75° 19.4'W to Chiloé (Chile) (42° 48'S; 74° 21'W).

sea cucumbers could be processed into biscuits, chips, jelly, noodles, and pickles.

Market

The demand for smoke-dried or dried sea cucumbers is high in Asian countries. These are being sold in Taiwan, Hong Kong, Korea, Japan, Singapore, and the People's Republic of China. In the Philippines, the Chinese are the major buyers of sea cucumber products which can be found or are available in first class hotels and restaurants.

Source:

Philippine Council for Aquatic and Marine Research and Development. Smoke-dried sea cucumber (tinapang balatan). Los Baños, Laguna: PCAMRD-DOST. *PCAMRD Waves* 17(3): 9, 2005.

PCAARRD Information Bulletin No. 7/2012

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Email: pcarrd@pcarrd.dost.gov.ph

Website: <http://www.pcarrd.dost.gov.ph>



DEPARTMENT OF TRADE & INDUSTRY BUREAU OF MICRO, SMALL AND MEDIUM ENTERPRISE DEVELOPMENT (BMSMED)

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Trunkline No.: 751.0384
Tel. Nos.: (02) 897.1693 / 897.7596 / 890.4968
Fax No.: (02) 896.7916 • Email: bmsmed@dti.gov.ph
www.dti.gov.ph



Philippine Council for Agriculture,
Aquatic and Natural Resources Research
and Development (PCAARRD)
Department of Science and Technology (DOST)



Smoke-Dried Sea Cucumber (Tinapang Balatan)

Description

One of the most valuable marine invertebrates which are processed into food are sea cucumbers. Sea cucumbers are locally known as 'balat,' 'balatan,' or 'trepang,' and commercially known as *beche de mer*. These sea animals belong to a group called Holothurians.

There are 100 species of sea cucumbers found in the Philippines but only about 50 are with commercial value. The top five commercially exploited species are white teatfish or 'susuan' (*Holothuria nobilis*), black teatfish or 'bakungan' (*Actinopyga mauritiana*), sandfish or 'putian' (*Holothuria scabra*), deep water red fish or 'talipan' (*Thelenota ananas*), and curry fish or 'hanginan' (*Stichopus hermanni* or *S. horrens*). Among the species mentioned, the white teatfish and sandfish are the most expensive and generally preferred species.

Sea cucumbers are classified into high, medium, and low value species. It is usually prepared as delicacies and condiments for soups, noodles and other dishes, and sometimes prepared as salads, eaten fresh or fermented. Rich in protein and minerals, sea cucumbers also have curative properties for ailments such as high blood pressure, muscular disorder, whooping cough, bronchial inflammation, and minor wounds.

In dried form, the product contains 43% protein, 2% fat, 21% minerals, 17% moisture, and 7% insoluble ash.



Sources of Sea Cucumbers

Sea cucumbers are collected from coastal waters. The supply peaks in the summer months, from March to mid-July.

Sea cucumber processing is an industry in Calatagan, Batangas; Mauban and Pollilio Islands in Quezon; Puerto Princesa, Palawan; Camarines Sur and Camarines Norte; Sorsogon; in the towns of Bolinao and Bani, Alaminos in Pangasinan; San Fernando, La Union; San Vicente, Cagayan; Masinloc, Zambales; Cebu and Negros Occidental; Villareal and Catbalogan in Samar; Surigao del Norte; South Cotabato; Tawi-tawi; and Sulu.

Traditional Processed Products

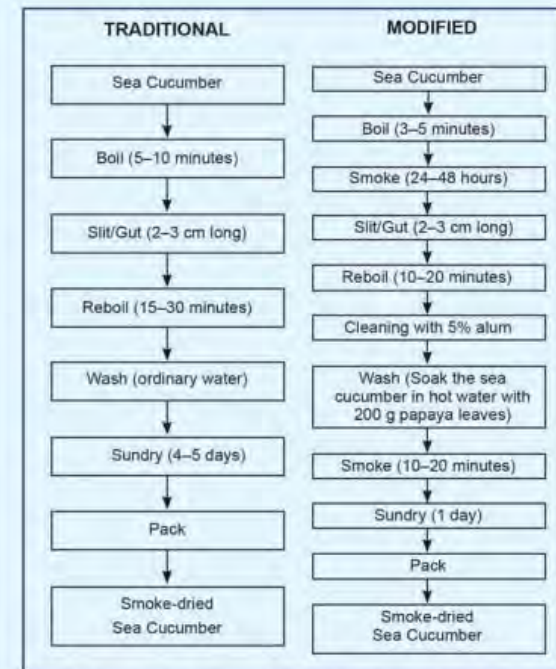
Traditionally, sea cucumbers are cleaned by burying under the sand overnight and washing in hot water to remove the hard covering and other impurities on their skin. These are then prepared as smoke-dried and boil-dried, and are sold commercially in such forms.

Sea cucumbers may be cooked with chicken, shrimp, pork, and/or vegetables and is usually served as soup or as a separate dish.

Improved and Value-added Products (Modified)

Exporters and processors of sea cucumbers claim that smoke-dried sea cucumber products had short storage life. The products are usually attacked by molds thereby resulting to poor quality and lower prices. To improve the products' quality and storage life, a modified procedure was developed.

The improved process of preparing smoke-dried sea cucumber involves soaking in hot water with leaves of *Carica papaya*. About 200 g of papaya leaves are added to ease out the removal of the hard material or the calcareous substance which is attached to the body. This process also improves the appearance of the product.



Traditional and modified procedures of smoke-drying sea cucumber.

From its traditional boiling time of 5–10 minutes, modified procedure was shortened to only 3–5 minutes. A reduction of 5–10 minutes is also observed in the reboiling process.

The traditional smoking process was also reduced from 24 to 48 hours to 10–20 hours while the improved sundrying process lasts for only one day. Smoking and drying processes are also shortened resulting in a more superior product.

Rejected and low-priced smoke-dried sea cucumbers could be utilized and processed into value-added products. On the other hand, low-value species of

Table 2. Changes in mean body length and weight (\pm standard error [SE]), and their percentage of initial (whole, fresh) measurements, across the different stages of processing selected species of sea cucumbers into beche-de-mer. Stages: 1 = whole, fresh body; 2 = gutted, fresh; 3 = gutted and salted (after 10 days); 4 = boiled and dried.

| | Processing stage: | Body length (cm) | | | Body weight (g) | | | |
|------------------------------|-------------------|------------------|-----------|-----------|-----------------|----------|----------|----------|
| | | 1 | 3 | 4 | 1 | 2 | 3 | 4 |
| <i>Actinopyga echinites</i> | Mean | 19 | | 8 | 334 | 231 | | 35 |
| | SE | ± 0.3 | | ± 0.2 | ± 20 | ± 14 | | ± 2 |
| | % | 100 | | 42.1 | 100 | 69.2 | | 10.5 |
| <i>Actinopyga spinea</i> | Mean | 27 | 21 | 13 | 1352 | 735 | 507 | 99 |
| | SE | ± 1 | ± 1 | ± 1 | ± 72 | ± 39 | ± 26 | ± 11 |
| | % | 100 | 77.8 | 48.1 | 100 | 54.4 | 37.5 | 7.3 |
| <i>Holothuria lessoni</i> | Mean | 31 | 28 | 16 | 2256 | 1456 | 1187 | 221 |
| | SE | ± 1 | ± 1 | ± 0.2 | ± 80 | ± 50 | ± 32 | ± 7 |
| | % | 100 | 90.3 | 51.6 | 100 | 64.5 | 52.6 | 9.8 |
| <i>Stichopus herrmanni</i> | Mean | 37 | | 14 | 2658 | | | 88 |
| | SE | ± 2 | | ± 0.3 | ± 154 | | | ± 5 |
| | % | 100 | | 37.8 | 100 | | | 3.3 |
| <i>Holothuria whitmaei</i> | Mean | 25 | 27 | 15 | 1829 | 1174 | 968 | 213 |
| | SE | ± 0.8 | ± 0.9 | ± 0.4 | ± 104 | ± 45 | ± 35 | ± 14 |
| | % | 100 | 108.3 | 59.9 | 100 | 64.2 | 52.9 | 11.6 |
| <i>Actinopyga palauensis</i> | Mean | 27 | 23 | 15 | 1416 | 985 | 740 | 165 |
| | SE | ± 0.7 | ± 2 | ± 0.5 | ± 86 | ± 61 | ± 44 | ± 11 |
| | % | 100 | 85.9 | 53.8 | 100 | 69.6 | 52.3 | 11.7 |

Promedio de individuos por kg

Rendimiento en el procesamiento

29
10,5%

10
7,3%

4
9,8%

11
3,3%

5
11,6%

6
11,7%

1 – fresco, entero

2 – fresco, eviscerado

3 – eviscerado, salado (después de 10 días)

4 – hervido y seco

Fuente: Changes in weight and length of sea cucumbers during conversion to processed beche-de-mer: Filling gaps for some exploited tropical species
Steven W. Purcell, Hugues Gossuin, Natacha S. Agudo

**Precios al por menor
de pepino de mar secos
en el Sudeste Asiático**

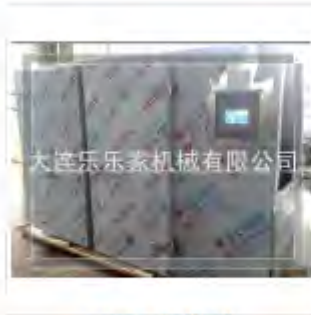
| Sea cucumber species | Value range (US\$) |
|--|--------------------|
| <i>Stichopus hermanni</i> | 62.50 |
| <i>Stichopus chloronotus</i> | 21.25–65.00 |
| <i>Holothuria (Microthele) nobilis</i> | 20.00–78.95 |
| <i>Bohadschia argus</i> | 20.00–30.00 |
| <i>Apostichopus japonicus</i> | 17.50–112.50 |
| <i>Holothuria fuscogilva</i> | 15.50–95.00 |
| <i>Thelenota ananas</i> | 12.50–67.50 |
| <i>Holothuria scabra</i> | 9.00–112.50 |
| <i>Actinopyga lecanora</i> | 8.00–71.25 |
| <i>Actinopyga miliaris</i> | 8.00–44.00 |
| <i>Holothuria edulis</i> | 8.00–22.50 |
| <i>Stichopus variegatus</i> | 6.75–62.50 |
| <i>Actinopyga mauritiana</i> | 5.00–15.00 |
| <i>Holothuria sp.</i> | 4.75–44.00 |
| <i>Actinopyga echinites</i> | 4.50–57.50 |
| <i>Thelenota anax</i> | 3.68–60.00 |
| <i>Holothuria rigida</i> | 3.00–59.00 |
| <i>Holothuria impatiens</i> | 2.50 |
| <i>Holothuria atra</i> | 1.75–22.50 |
| <i>Pearsonothuria graeffei</i> | 1.75–5.00 |
| <i>Bohadschia marmorata</i> | 1.40–23.75 |

Source: SEAFDEC (2009)

Principales aspectos que influyen a los precios del pepino de mar:

- Especie y tamaño
- Localización del corte, verificar si tiene olor a podrido, el color, si está totalmente seco
- Contenido de sal, olor a humo

Products > Sea cucumber drying machine



HFD-1智能型
FD automatic sea cucumber drying machine



HFD-1触摸屏
FD automatic sea cucumber drying machine



HSJ-1
New technology of FD sea cucumber drying machine



HSJ-900
New technology of FD sea cucumber drying machine



HSJ-900
Natural circulation sea cucumber drying machine



HSJ-400
Natural circulation sea cucumber drying machine



HSJ-300
Tunnel wind drying room



HSJ-300
Sea cucumber shaping and drying room



HSJ-600
Sea cucumber drying dehydration shaping machine



HSJ-800
Sea cucumber drying dehydration shaping machine



HSJ-600
Large scale cryogenic sea cucumber drying machine

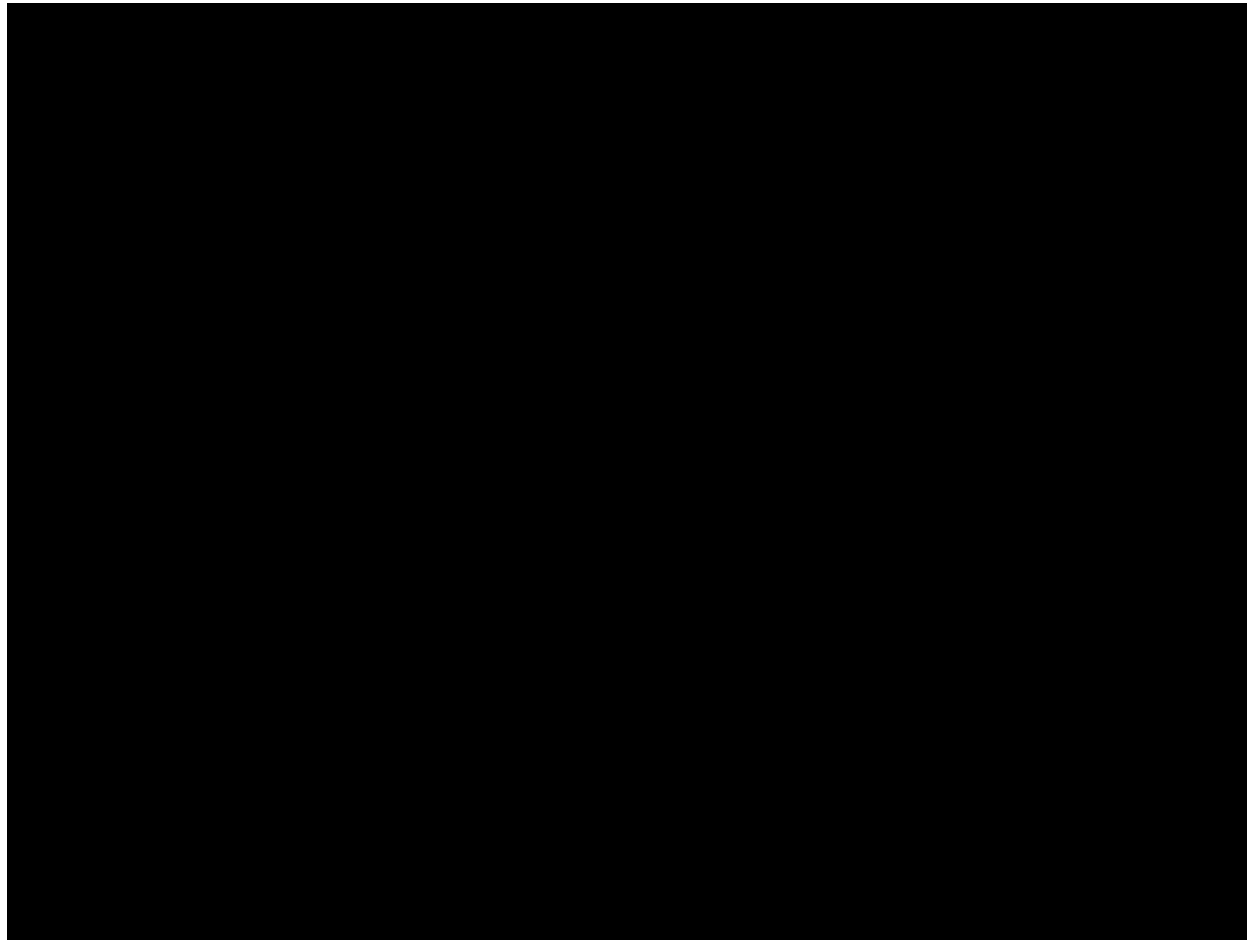


HSJ-1
Large scale cryogenic sea cucumber drying machine



HSJ-1
Tray type sea cucumber drying machine []

<https://www.youtube.com/watch?v=kU-nWv8Mvr8>



30 Pesos Mexicanos = USD 2,30
280 Pesos Mexicanos = USD 21,5

jCuidado con los pepinos de mar venenosos!

Those who wish to consume the sea cucumber during Chinese New Year, considered a delicacy, should purchase it from a trusted source to avoid any poisoning .

In recent years, **some unscrupulous traders had mixed poisonous sea cucumber with non-poisonous ones** due to high demand.

It is easier to identify an edible sea cucumber when bought fresh rather than dry .

However he cautioned that **the poisonous ones would look similar to the non-poisonous ones** , which made it difficult for others to note the difference.

The very poisonous sea cucumber is the *Holoturia atra* species, which is black in colour and has smooth skin.

A local sea cucumber wholesaler said in Sabah about 20 species were harvested , processed and exported to restaurants in peninsula Malaya. He said that the lower grade sea cucumbers cost slightly over RM 100 for each kilo, while those of good quality could fetch up between RM 800 and over RM 1000.

RM 100 = USD 30,60

RM 800 = USD 245

RM 1000= USD 306

RM = Malaysian Ringgit



2 die after eating poisonous sea cucumber



The Star/Asia News Network
Kuala Lumpur, Feb 03, 2013

KOTA KINABALU - Two men have died after eating a poisonous species of sea cucumber in Sabah's northern Kudat district.

State Fisheries Department director Rayner Stuel Galid said the deaths were due to the consumption of a species of sea cucumber known locally as pelanduk laut and unrelated to the red tide poisoning.

"We tested the specimen and found that the sea cucumber has its own toxin," he said when contacted.

The men, aged 51 and 54, died at the Queen Elizabeth Hospital here on Thursday after they became ill from eating the sea cucumber during a meal with four other people at Kg Suaregal in Kudat.

It is learnt that the two men, who had suffered from severe vomiting, numbness and breathing difficulties, were initially treated at the Kudat Hospital on Wednesday before being transferred to the Queen Elizabeth Hospital here.

Two others who took the same meal were also treated in Kudat but they had less severe symptoms.

The toxic sea cucumber, which has black and purple dots, is found in Kudat's Marudu bay.

Two people have so far died from red tide poisoning in Sabah since it first occurred off its shores in November in a phenomenon that is expected to last until June.

The red tide phenomenon is triggered by a deadly algae bloom, which produces toxic or harmful effects to marine life and turns the water red.



Get sea cucumber from trusted source to avoid poisoning



The Star/Asia News Network
Kuala Lumpur, Feb 03, 2013

PETALING JAYA - Those who wish to consume the sea cucumber during Chinese New Year, considered a delicacy, should purchase it from a trusted source to avoid any poisoning, said Universiti Sains Malaysia's marine biologist Prof Dr Zulfigar Yusoff.

He said that in recent years, some unscrupulous traders had mixed poisonous sea cucumbers with non-poisonous ones due to high demand.

"It is best to purchase them in wet condition as it is easier to differentiate them

"And buy from people who are culturing them or from reputable sources," he said when contacted.

Dr Zulfigar said that sea cucumber that were edible were usually larger in size.

"It is easier to identify an edible sea cucumber when bought fresh rather than dry," he said.

However, he cautioned that the poisonous ones would look similar to the non-poisonous ones, which made it difficult for others to note the difference.

He said that he had seen people collecting poisonous ones along the Straits of Malacca and sold them to interested buyers.

"The very poisonous sea cucumber is the *Holoturia atra* species which is black in colour and has smooth skin," he said, adding that in some Pacific islands, they were used to poison fish.

Dr Zulfigar said that holoturia poisoning was rare and difficult to be detected in the blood because the amount of poison was too minute, while poisoning could also happen when other contaminated shellfish were eaten together with the sea cucumber.

There were more than 100 common sea cucumber species in Malaysia and the Chinese consumed them as food while the Malays used them as medicines, he said.

The Chinese consume several species including many *Stichopus* species and the *Holothuria scabra* (or seafish) while the *Thalassia* *Aranea* were valuable species, he said.

For the Malays, the *Stichopus hermanni* species was used as medicine as a drink or ointment, he added.

He said that many sea cucumbers were found in deep waters while some only came out of the reefs at night.

In KOTA KINABALU, a local sea cucumber wholesaler said in Sabah, about 20 species were harvested, processed and exported to restaurants in peninsula Malaysia.

"However, there are one or two species that we do not use as they are quite toxic," he said, adding that most of their stock were obtained from Sabah's east coast Semporna.

The wholesaler, who only wanted to be identified as Qian, said lower grade sea cucumbers cost slightly over RM100 for each kilo while those of good quality could fetch up to between RM800 and over RM1,000.

Chinese medicine shop owner Paul Huang said that most buyers would consume sea cucumber for better blood circulation as well as to ease joint pains.



HK\$ 13800 /Lb = **USD 3910 / kg**

HK\$ 9600/Lb = **USD 2720 / Kg**



HK\$ 880 /Lb = **USD 250 / kg**

HK\$ 1680/Lb = **USD 476 / Kg**

Fig. 1. Dried sea cucumbers for sale in retail shops in Hong Kong; a) *Apostichopus japonicus*, b) *Holothuria lessona*, *H. scabra*, *H. whitmaei*, *H. fuscogilva* and *Isostichopus badionotus* for sale next to dried shark fin. Prices are in HK\$ per 600 g (i.e. per pound). Photos: S. Purcell.

Fuente:
 "Sea cucumber culture, farming and sea ranching in the tropics: Progress, problems and opportunities"
 Steven W. Purcell , Cathy A. Hair, David J. Mills



390 yuans = USD 62,40

Sub-Productos de Pepinos de Mar

El ejemplo de la *Cucumaria frondosa*





US007163702B1

Description:

1. Field of the Invention The present invention relates to saponins isolated from sea cucumbers, particularly the saponins known as Frondoside A. 2. Description of the Related Art Saponins, or glycosides consisting of a sugar moiety and triterpene or steroid aglycon, are widely distributed in plants. Saponin distribution in animals is very limited. The presence of triterpene glycosides is characteristic for most sea cucumbers, the animals belonging to the class Holothurioidea (phylum Echinodermata) and for some sponges. Triterpene glycosides of the sea cucumbers have lanostane-type aglycons, most have aglycons with 18(20)-lactones and are referred to as holostanetype. The carbohydrate moieties of the sea cucumber glycosides consist of two six sugar residues, including xylose, quinovose, glucose, 3-O-methyl-glucose and (rarely) 3-O-methyl-xylose and may contain one, two or three sulfate groups. (V. A. Stonik, V. I. Kalinin, S. A. Avilov, "Toxins from Sea Cucumbers (Holothuroids): Chemical Structures, Properties, Taxonomic Distribution, Biosynthesis and Evolution," J. Nat. Toxins. 1999, 8, 235-248) Because of the ability to form a complex with 5(6)-unsaturated sterols of cellular membranes, the glycosides possess a wide spectrum of biological activities including hemolytic, antifungal, cytotoxic, and many other kinds of membranotropic action. Moreover, these glycosides are known as having effective immunomodulatory action at very low concentrations that may have practical significance. (V. I. Kalinin, M. M. Anisimov, N. G. Prokofieva, S. A. Avilov, S. S. Afiyatullo, V. A. Stonik, "Biological activities and biological role of triterpene glycosides from holothuroids (Echinodermata)". Echinoderm Studies. Vol. 5, A. A. Balkema, Rotterdam, pp. 139-181, 1996) Immunomodulatory activity was studied for several species of holothurians. (D. L. Aminin, I. G. Agafonova, E. V. Berdyshev, E. G. Isachenko, S. A. Avilov, V. A. Stonik, "Immunomodulatory Properties of cucumario

(12) **United States Patent**
Avilov et al.

(10) Patent No.: **US 7,163,702 B1**
(45) Date of Patent: **Jan. 16, 2007**

SUMMARY OF THE INVENTION

It is an object of the present invention to provide industrially relevant and effective means of isolating the sea cucumber glycoside, Frondoside A, from sea cucumber food processing operations, or sea cucumber tissue, and especially the "cooking water" by-product of such processing. An additional object of the present invention is to provide means of guaranteeing stable stimulating and/or potentiating of the immune system of a mammal in need of same, and especially industrially farmed animals, or pet ferrets at risk of viral, fungal, or opportunistic diseases associated with decreased immunological response by the mammal.

It is an additional object of the present invention to provide an effective medicament for use by immunocompromised animals, especially humans, including but not limited to humans infected with the HIV virus, and humans during disease treatment involving radiation or chemotherapy. Additionally, such a medicament may be in any form appropriate as determined by any person skilled in the health-therapy arts.

Present invention is directed to a method for recovering *Cucumaria frondosa* saponins which comprises:

- i) Extracting (a) freeze dried form of water which has been used to cook *Cucumaria frondosa*, wherein said water contains *Cucumaria frondosa* residues or (b) dried and powdered tissues of *Cucumaria frondosa* with a mixture of chloroform and methanol under reflux to obtain an organic extract.
- ii) Evaporating the extract;
- iii) Extracting the evaporated extract with ethyl acetate and water one or more times to obtain aqueous phase;
- iv) Combining the aqueous phase from each ethyl acetate and water extraction;
- v) Perform chromatography of the aqueous phase on Teflon or other non-polar resin and Silica gel columns; and
- vi) Collecting the eluate to obtain *Cucumaria frondosa* saponins.

Article: Frondoside A inhibits human breast cancer cell survival, migration, invasion and the growth of breast tumor xenografts.

Nadia Al Marzouqi, Rabah Iratni, Abderrahim Nemmar, Kholoud Arafat, Mahmood Ahmed Al Sultan, Javed Yasin, Peter Collin, Jan Mester, Thomas E Adrian, Samir Attoub

[hide abstract]

ABSTRACT: Breast cancer is a major challenge for pharmacologists to develop new drugs to improve the survival of cancer patients. Frondoside A is a triterpenoid glycoside isolated from the sea cucumber, *Cucumaria frondosa*. It has been demonstrated that Frondoside A inhibited the growth of pancreatic cancer cells *in vitro* and *in vivo*. We investigated the impact of Frondoside A on human breast cancer cell survival, migration and invasion *in vitro*, and on tumor growth in nude mice, using the human estrogen receptor-negative breast cancer cell line MDA-MB-231. The non-tumorigenic MCF10-A cell line derived from normal human mammary epithelium was used as control. Frondoside A (0.01-5 μ M) decreased the viability of breast cancer cells in a concentration- and time-dependent manner, with 50%-effective concentration (EC50) of 2.5 μ M at 24h. MCF10-A cells were more resistant to the cytotoxic effect of Frondoside A (EC50 superior to 5 μ M at 24 h). In the MDA-MB-231 cells, Frondoside A effectively increased the sub-G1 (apoptotic) cell fraction through the activation of p53, and subsequently the caspases 9 and 3/7 cell death pathways. In addition, Frondoside A induced a concentration-dependent inhibition of MDA-MB-231 cell migration and invasion. *In vivo*, Frondoside A (100 μ g/kg/day*i.p.* for 24 days) strongly decreased the growth of MDA-MB-231 tumor xenografts in athymic mice, without manifest toxic side-effects. Moreover, we found that Frondoside A could enhance the killing of breast cancer cells induced by the chemotherapeutic agent paclitaxel. These findings identify Frondoside A as a promising novel therapeutic agent for breast cancer.

European journal of pharmacology 06/2011; 668(1-2):25-34. • 2.59
Impact Factor

De alguna forma las tradiciones chinas se encuentran respaldadas por la ciencia occidental: El pepino de mar puede tener efectos terapéuticos.



Mercado, productos y precios: un paralelo entre los pepinos de mar y los hongos

- Gran variedad de especies, de tamaños y de aspectos organolépticos
- Muchos de ellos tienen efectos terapéuticos (penicilina...)
- Variedad de presentaciones: frescos, secos, en conservas...
- ¡ Cuidado con las especies venenosas !
- Gran variedad de precios, llegando a miles de USD por kg

CHAMPIGNONS ET TRUFFES



"LES BRISURES DE TRUFFES"

SÉLECTION PROPOSÉE

"les brisures de Truffes délices en bocal de 12.5g"

Prix : 21.1 € (21.10 € / unité)



= USD 2363/kg



LES PLEUROTÉS

SÉLECTION PROPOSÉE

"La barquette" de 250g

Prix : 2.79 € (11.16 € / kg)

"La barquette" de 750g

Prix : 7.74 € (10.32 € / kg)

"Le prix grossiste", le colis de 2kg

Prix : 17.79 € (8.90 € / kg)

De USD 12,46/kg a USD 15,62/kg



LES CHAMPIGNONS SÉCHÉS

SÉLECTION PROPOSÉE

Les champignons noirs : "Les 100g"

Prix : 3.84 € (38.40 € / kg)



La garniture forestière : "Les 100g"

Prix : 4.38 € (43.80 € / kg)



Les cèpes : "Les 100g"

Prix : 10.39 € (103.90 € / kg)



Les morilles : "Les 100g"

Prix : 63.66 € (636.60 € / kg)



De USD 53,76/kg

a

USD 891,24/kg

Le Cordyceps Sinensis, le champignon le plus cher du monde



Paralelo con el mercado de hongos

Hongos a

USD 8000/kg

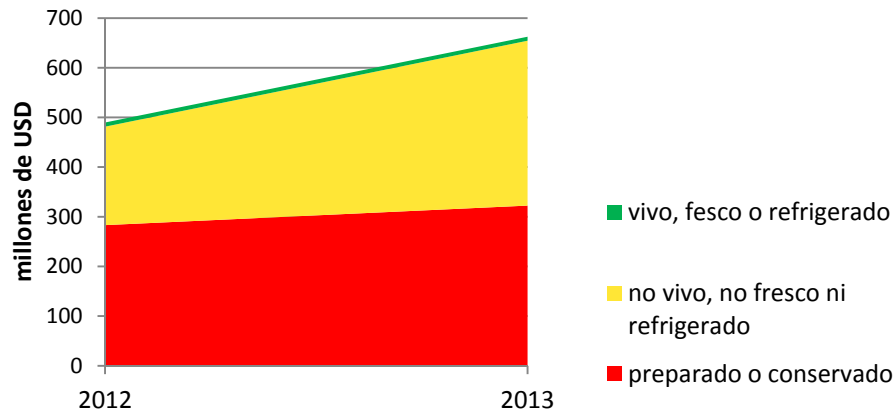
Bien que la saison des champignons soit loin de nous désormais, elle fait fureur en ce moment chez nos amis tibétains. Mais les habitants de cette région ne cueillent pas n'importe quel champignon! L'objet de leur chasse effrénée est de récolter un maximum de *Cordyceps Sinensis*. Quel est la particularité de ce champignon et pourquoi est-il si difficile à trouver?

Le *Cordyceps Sinensis*, ou Yarsagumba, est un champignon qui a la particularité de ne pousser uniquement que dans les pâturages de l'Himalaya, soit au dessus de 4000 mètres d'altitude. Il est le fruit du parasitage d'une chenille par un champignon, qui se nourrit de cette larve pour se développer. La "plante insecte", comme le surnomme les indiens, ne peut être récolter qu'à la fonte des glaces sur les plateaux tibétains, car sa taille hors sol n'excède pas 2 cm.

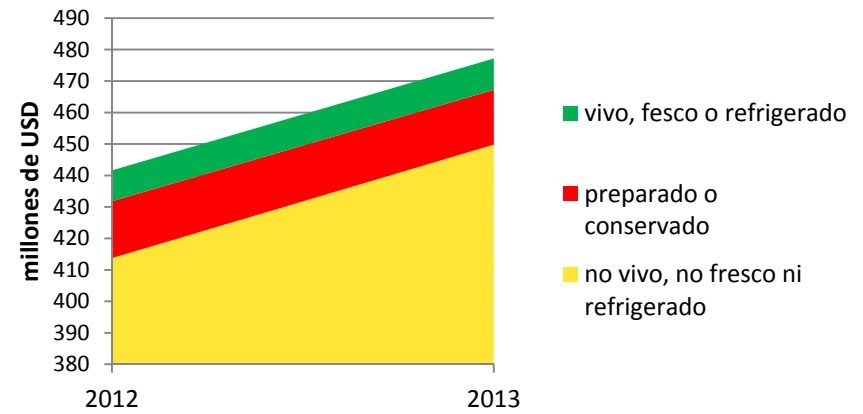
Ce champignon aurait énormément de vertus médicinales. Il serait capable de soigner des pathologies cardiaques, renforcerait les défenses immunitaires et serait un excellent activateur de libido. Par conséquent, il est très prisé des milliardaires chinois, ce qui en augmente sa valeur. Cette rareté a bien sur un prix: le kilo se négocie entre 4000\$ et 8000\$ en fonction de la qualité. Ça fait un peut cher le viagra naturel!

La Distribución

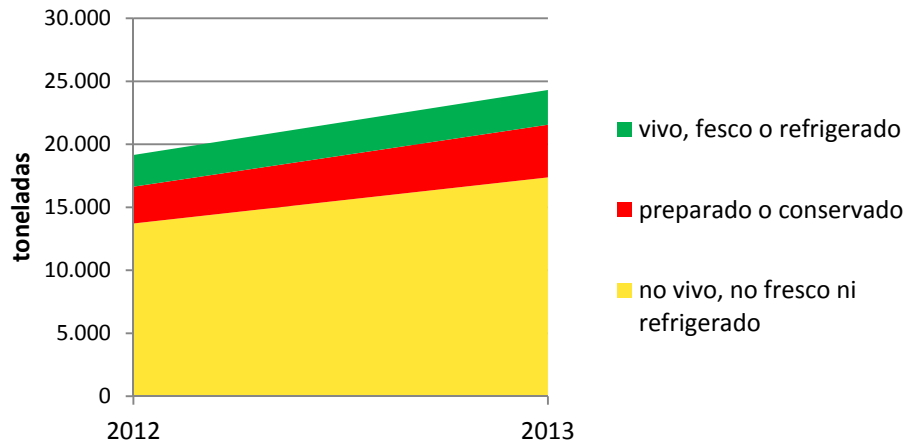
Evolución de las exportaciones mundiales de pepinos de mar: 2012 - 2013



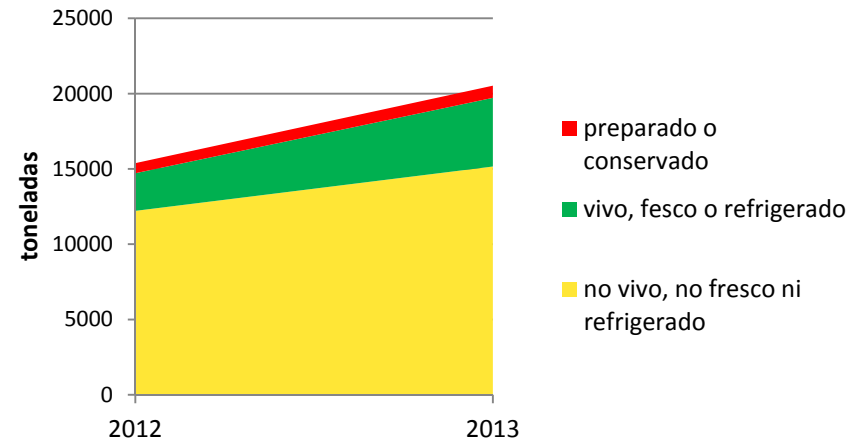
Evolución de las importaciones mundiales de pepinos de mar: 2012 -2013



Evolución de las exportaciones mundiales de pepinos de mar: 2012 -2013



Evolución de las importaciones mundiales de pepinos de mar: 2012 -2013





Dried sea cucumber

US \$2.5-3.5 / Gram (FOB Price)

1 Box (Min. Order)

10 Kilogram/Kilograms per Day (Supply Ability)

Tags: The Best Sea Cucumber | Dried Sea Cucumber For Sale | Price Of Dried Sea Cucumber

dried sea cucumber in Dominican Republic ([View all 6 Product\(s\)](#))



Dry Sea Cucumber

US \$28-35 / Kilogram (FOB Price)

1 Ton (Min. Order)

Product Type: Fish ; Place of Origin: DO ; Weight (kg): 1 ; Shape: Piece ; Brand Name: Sea Cucumber ; Style: Dried ; Species: Holouthoria,

★ Favorites + Compare

Fresquisimo
Dominican Republic | [Contact Details](#)

Contact Supplier Leave Messages



Dried Sea Cucumber

US \$3.06 / Unit (FOB Price)

1 Ton (Min. Order)

Product Type: Fish ; Place of Origin: DO ; Weight (kg): 1 ; Shape: Piece ; Drying Process: VF ; Brand Name: Sea Cucumber ; Style: Dried ; Species:

★ Favorites + Compare

Fresquisimo
Dominican Republic | [Contact Details](#)

Contact Supplier Leave Messages



Dry Sea Cucumber

US \$28-35 / Kilogram (FOB Price)

1 Ton (Min. Order)

Product Type: Fish ; Place of Origin: DO ; Shape: Piece ; Brand Name: Fresquisimo ; Style: Dried ; Species: Holouthoria, badionotus, Cucumbers

★ Favorites + Compare

Fresquisimo
Dominican Republic | [Contact Details](#)

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Donkey Dung

US \$14-15 / Kilogram (FOB Price)

2000 Kilograms (Min. Order)

Type: Sea Cucumber ; Place of Origin: DO ; Packaging: Box ; Brand Name: Donkey Dung ; Style: Dried

Ocean and Fish Cx
Dominican Republic



sea cucumber

275 Kilograms (Min. Order)

Place of Origin: DO ; Weight (kg): 20 ; Packaging: boxes of 20kg ; Drying Process: AD ; Brand Name: sea cucumbers ; Style: Dried ; Shelf Life: 2

[View 1+ similar products](#)

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HISPANIOLA SEAFOOD
Dominican Republic | [Contact Details](#)

Contact Supplier Leave Messages

Provedores de Republica Dominicana:
Fresquisimo
Hispaniola Seafood

Quotation(s)

Share to: [f](#) [t](#) [p](#) [g+](#) [0](#)



wild dried sea cucumber/4-5cm DALIAN

Product Price: FOB dalian **US \$ 950.4~1059.3** / Kilogram/Kilograms

Quote Based on: 1000 Kilogram/Kilograms

Date Quoted: 03/04/2014

Payment Terms: L/C

[Get Latest Quote](#)

Product Details:

4-5 cm

Dried with 5% salt

from very fresh and wild deep sea

Natural Grown

Supplier Information

Dalian Menew Food Co., Ltd. 


[Liaoning, China (Mainland)]

Business Type:

Manufacturer, Trading Company

Learn more about AliSourcePro



 AliSourcePro

More Effective, Less Hassle

Sonac-Agricole West Indies exports 10.5 tons of sea cucumbers per month to China

Peace Dividend Marketplace – Haiti said, ‘we are going to match you with clients, we are not going to give you anything,’” Charles recalled. “Three weeks later I got a call from a guy from China.”

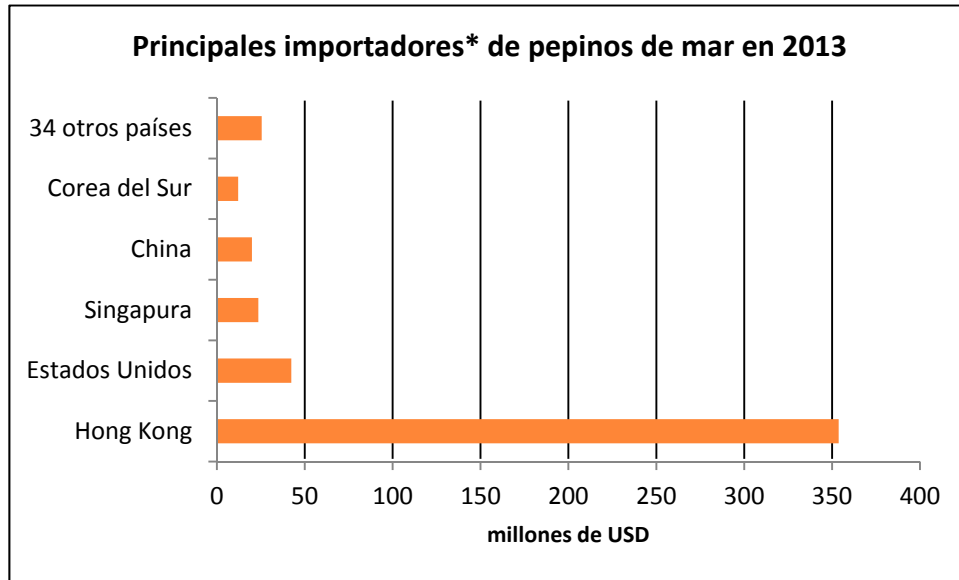
And it wasn’t just any company, it was Wampin Seafoods, which has a major share of the sea cucumber market in China. The company paid promptly and has even invested in machinery at the Sonac-Agricole plant. Today Charles travels regularly to Hong Kong.



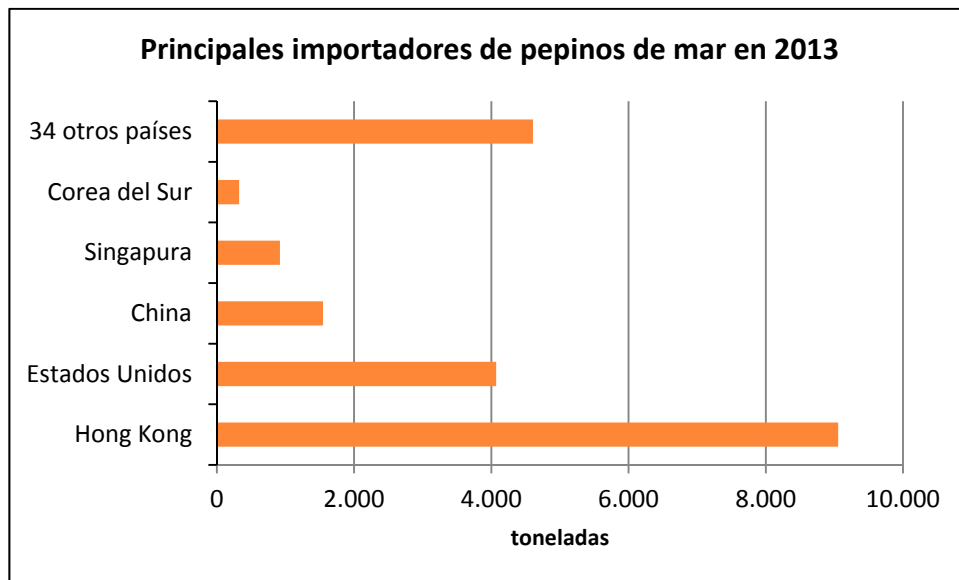
Ernest Charles of Sonac-Agricole shows the cucumbers he exports to China.

Sonac-Agricole directly employs 20 workers, but Charles takes particular prides in the fact that his firm works with 50 fishing cooperatives from all over Haiti. Each co-op has about 100 members roughly split between men who do the fishing and women who do the cleaning. The cucumbers must be cleaned, dried, and salted within 24 hours of being harvested, a labor-intensive process. In addition, his firm is a major buyer of salt because drying every 3.5 tons of sea cucumber requires 1 ton of salt.

IMPORTADORES



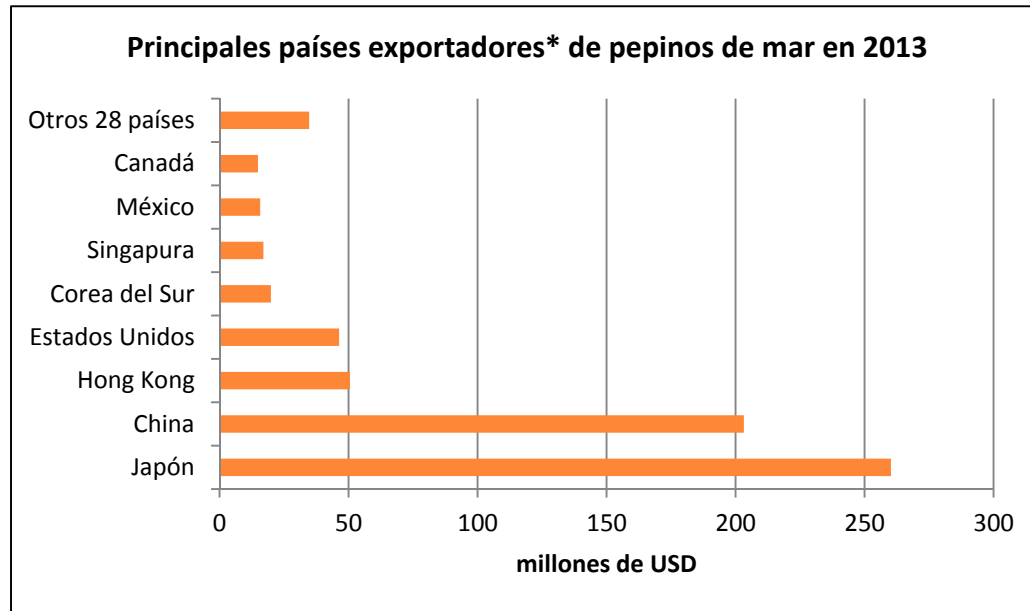
* Importaron por más de USD 10 millones



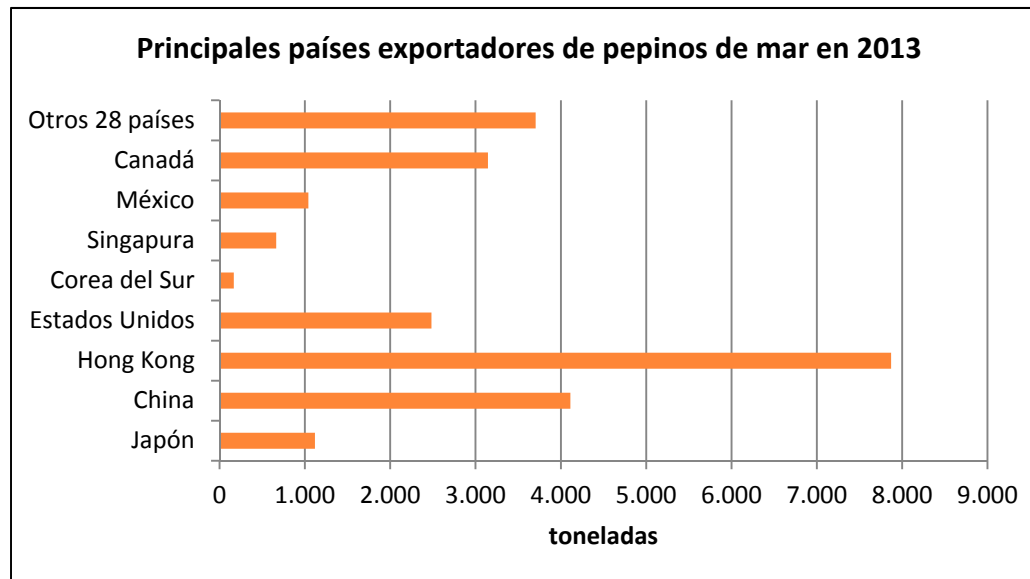
Los otros 34 países

| | USD | Toneladas |
|---------------|-----------|-----------|
| España | 4.911.291 | 2.152 |
| Tailandia | 4.776.279 | 248 |
| Canadá | 4.258.442 | 398 |
| Malasia | 2.999.883 | 856 |
| Australia | 2.629.484 | 45 |
| Bélgica | 1.644.517 | 236 |
| Francia | 1.222.622 | 363 |
| Taiwán | 1.146.743 | 71 |
| Bulgaria | 572.273 | 98 |
| Japón | 241.376 | 8 |
| Nueva Zelanda | 233.569 | 7 |
| Italia | 195.949 | 42 |
| Perú | 175.780 | 16 |
| Austria | 125.508 | 18 |
| Luxemburgo | 80.796 | 8 |
| Alemania | 46.702 | 7 |
| Grecia | 41.761 | 6 |
| Hungría | 32.222 | 6 |
| Letonia | 22.485 | 8 |
| Suecia | 20.348 | 2 |
| Mexico | 18.962 | 3 |
| Holanda | 17.231 | 2 |
| Malta | 10.551 | 0 |
| Portugal | 8.918 | 2 |
| Chipre | 5.016 | 1 |
| Eslovenia | 2.903 | 1 |
| Rep. Checa | 2.687 | 0 |
| Sudáfrica | 2.617 | 2 |
| Romania | 1.980 | 0 |
| Argelia | 1.244 | 0 |
| Suiza | 472 | 0 |
| Reino Unido | 397 | 0 |
| Dinamarca | 205 | 0 |
| Eslovenia | 67 | 0 |

EXPORTADORES



* Exportaron por más de USD 10 millones



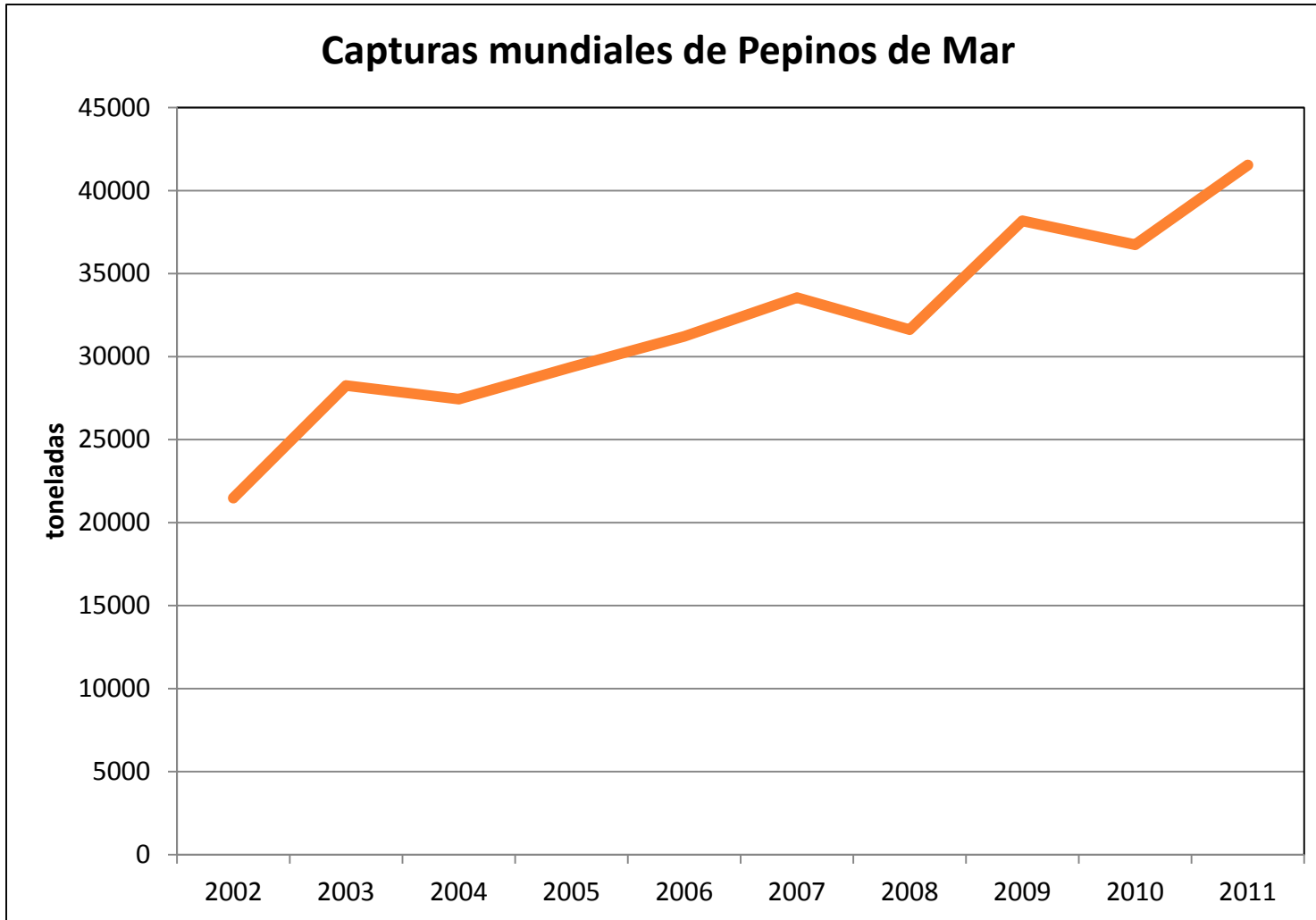
Fuente: INFOPECSA, basado en datos GTIS-FAO

Los otros 28 países

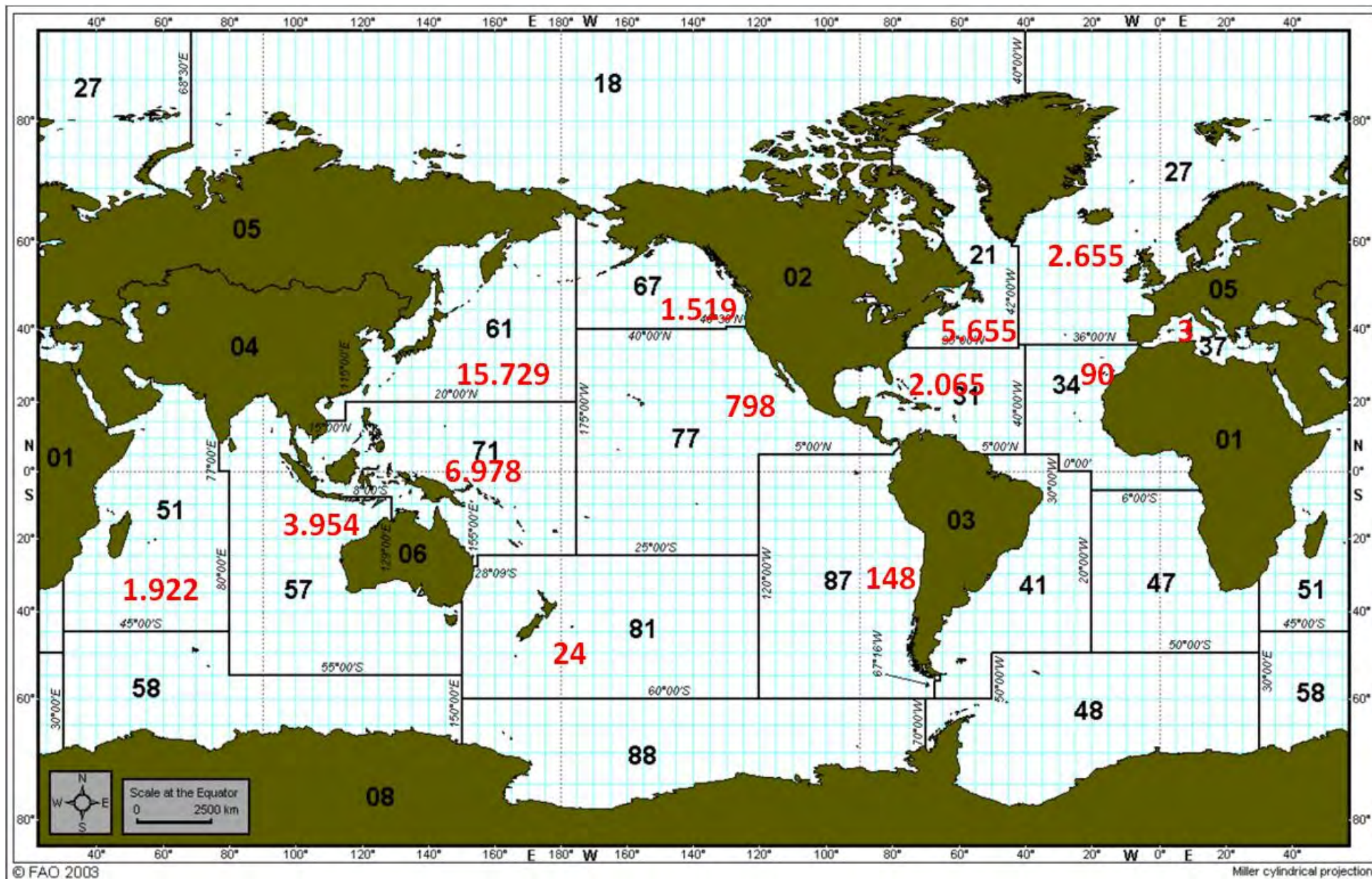
| | USD | Toneladas |
|----------------|-----------|-----------|
| Indonesia | 7.105.318 | 948 |
| Tailandia | 4.693.080 | 218 |
| Australia | 3.682.043 | 145 |
| Grecia | 3.665.029 | 353 |
| Perú | 2.778.865 | 139 |
| Nicaragua | 2.764.262 | 168 |
| España | 2.674.965 | 167 |
| Malasia | 2.016.264 | 606 |
| Islandia | 1.462.111 | 570 |
| Rusia | 1.062.155 | 198 |
| Chile | 895.311 | 26 |
| Taiwán | 549.603 | 25 |
| Francia | 441.268 | 29 |
| Reino Unido | 244.488 | 54 |
| Honduras | 193.186 | 20 |
| Sri Lanka | 178.806 | 7 |
| Bulgaria | 144.289 | 15 |
| Alemania | 89.312 | 5 |
| Bélgica | 41.818 | 5 |
| Holanda | 26.646 | 1 |
| Dinamarca | 11.645 | 1 |
| Italia | 9.984 | 3 |
| Austria | 8.088 | 1 |
| Nueva Zelandia | 6.244 | 0 |
| Irlanda | 5.796 | 0 |
| Sudáfrica | 4.394 | 0 |
| Portugal | 4.234 | 0 |
| Rep. Checa | 55 | 0 |

¿Cómo se atienden las demandas de los mercados?

Las capturas duplicaron en 10 años



Fuente: INFOPESCA, basado en estadísticas FAO



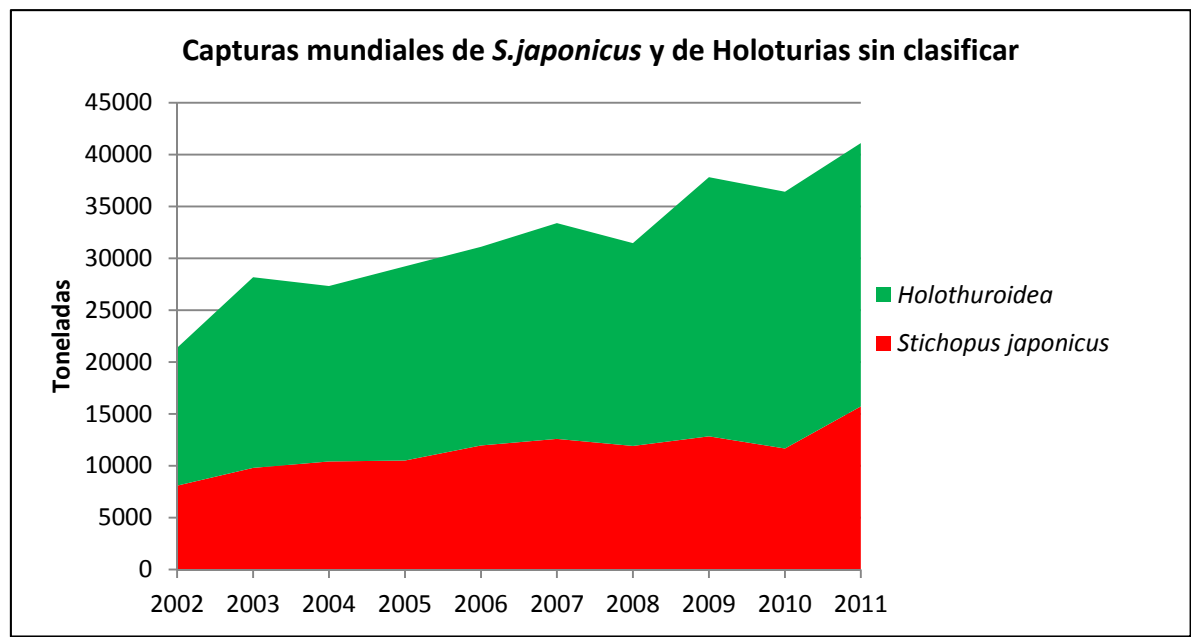
Índico
5.876 TM

Pacífico
25.196 TM

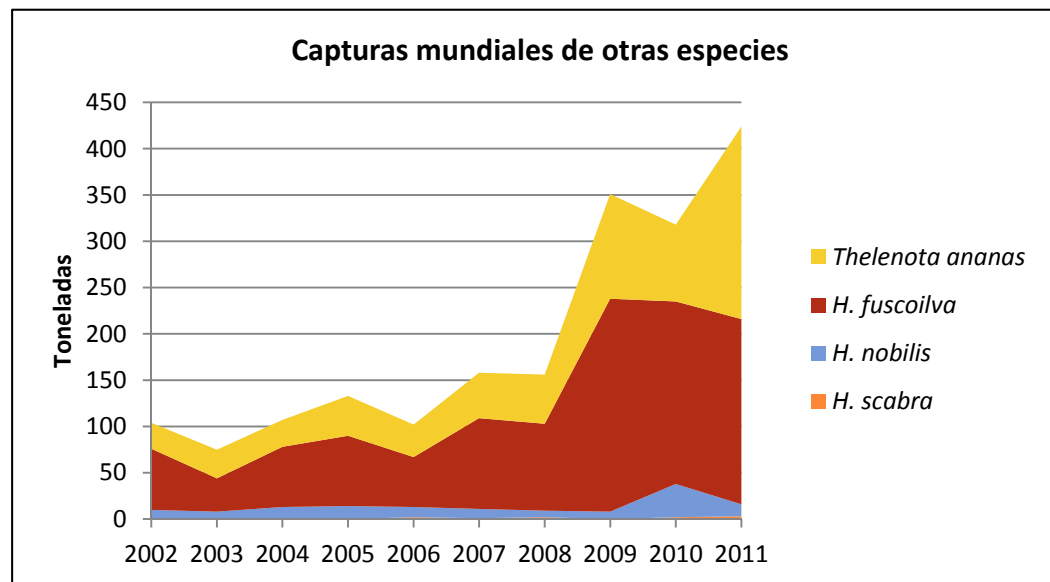
Capturas de Holoturias por áreas FAO en 2011

Atlántico y Mediterráneo
10.468 TM

Total: 41.540 toneladas

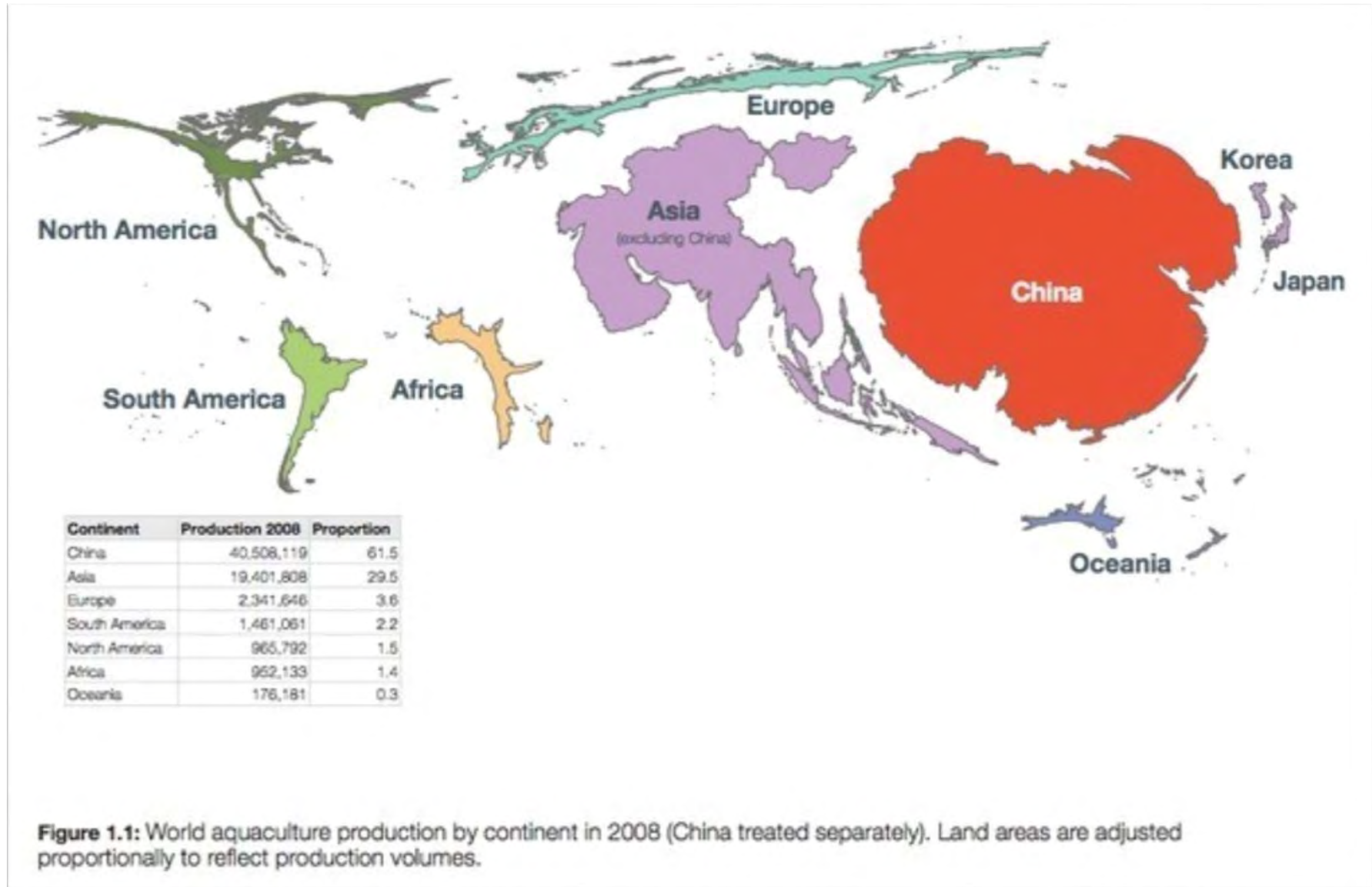


Escala en decenas de miles de toneladas

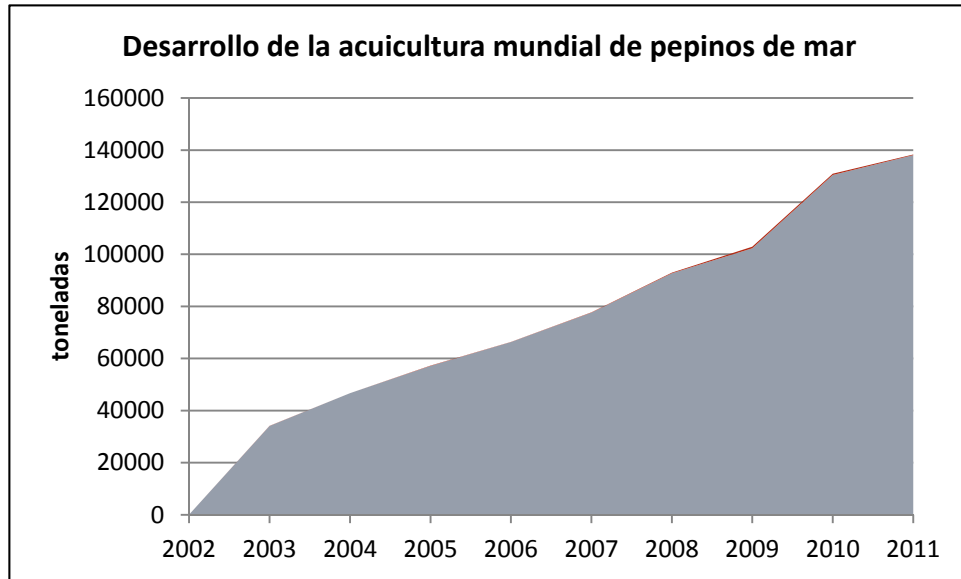


Escala en cientos de toneladas

**Principales productores acuícolas en general del mundo:
China de lejos el principal productor**



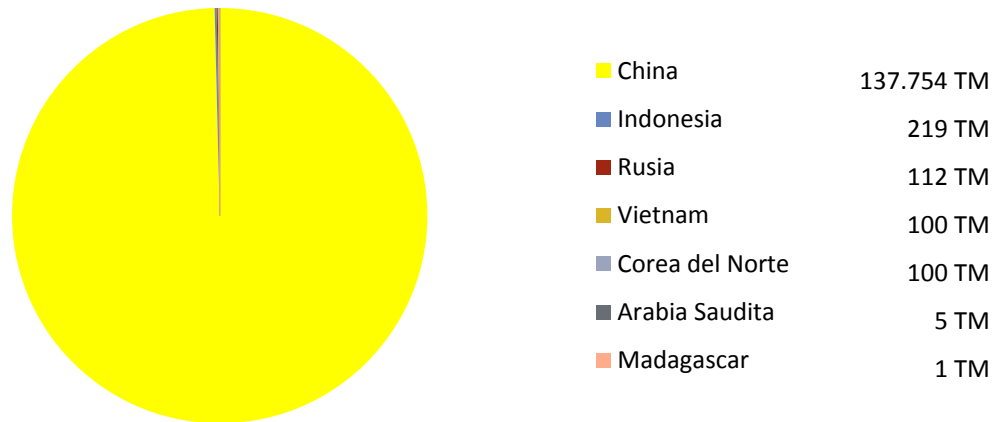
Fuente: *The Huffington Post*, Joe Satran



Stichopus japonicus: 99,76%
Holothuroidea: 0,16%
Holothuria scabra: 0,08%

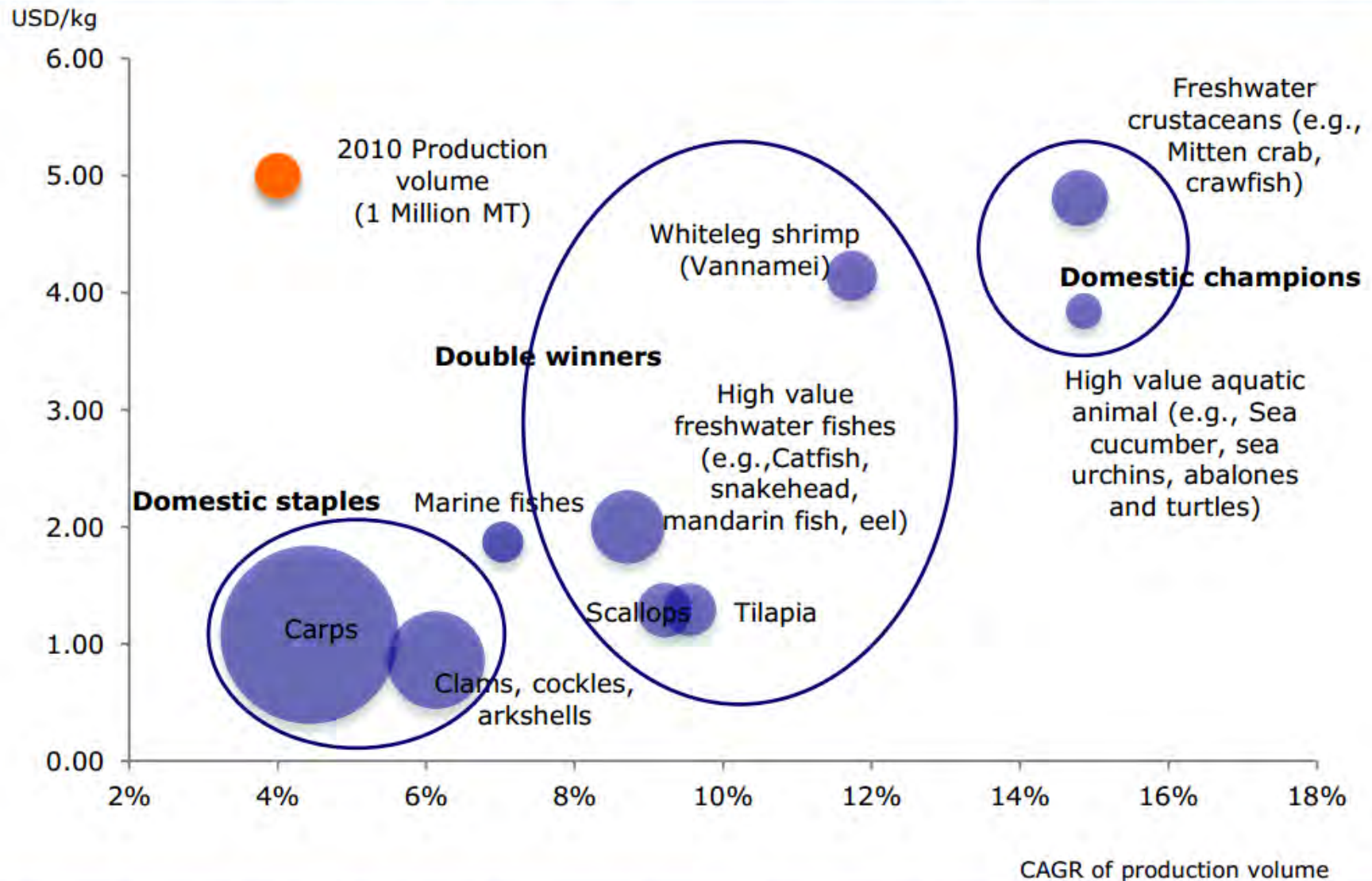
**Para los pepinos de mar,
 China es prácticamente
 el único productor acuícola**

**Productores acuícolas de pepinos de mar en 2011
 total: 138.291 toneladas**



Fuente: FAO

Figure 5: Chinese aquaculture production volume and 5-year average implied value dynamics

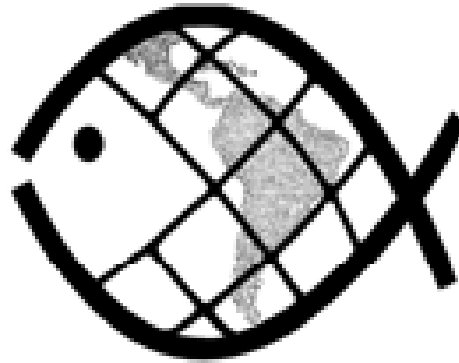


Source: Rabobank, Food and Agriculture Organization of the United Nations, 2012 CAGR = Compound Annual Growth Rate

Algunos comentarios y recomendaciones finales

- El mercado de pepino de mar continuará aumentando en China y posiblemente en otros países.
- Los stocks de pepinos de mar silvestres no soportaran mucho los esfuerzos adicionales de capturas
- Probablemente la acuicultura de pepino de mar continuará aumentando rápidamente, especialmente el *Apostichopus japonicus*, más demandado. ¿Se podrá cultivar el *Apostichopus japonicus* en AL, desde un punto de vista ambiental (especie exótica)?
- Especies nativas a cultivar, desde un punto de vista de mercado: *Isostichopus badionotus*, *Holothuria kefersteini*, *Holothuria mexicana*, *Holothuria atra*, *Isostichopus fuscus* y *Parastichopus californicus*.
- Posiblemente los precios aún podrán aumentar un poco más, pero la tendencia de la popularización del consumo (en China y en otras partes del mundo), aliada al desarrollo de la acuicultura llevará estos precios a disminuir.
- Un importante trabajo de mejora del procesamiento del pepino de mar se hace necesario en América Latina, de forma a atender perfectamente las demandas de los mercados finales.
- Una mayor presencia latinoamericana en China es aconsejable para el mejor conocimiento de los diversos mercados y nichos de mercado y de sus demandas específicas, permitiendo también negociaciones directas con los principales negociantes/importadores del sector. La diáspora china de América Latina puede ayudar en este sentido.

- También una mayor presencia en los demás mercados, en especial Estados Unidos, países europeos y sudeste asiático puede facilitar un comercio más rentable a los Latinoamericanos y Caribeños.
- Un sello de origen común latinoamericano/caribeño común, siguiendo estrictos estándares de calidad de la materia prima, del procesamiento, además de respecto ambiental puede constituir un valor añadido importante en determinados mercados y nichos de mercado.
- Investigaciones químicas-farmacéuticas podrán identificar nuevos sub-productos útiles en las diversas especies de pepinos de mar.



INFOPECA

i Gracias !

谢谢 !

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