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Review

Record of stomatopods and decapods, including descriptions of the species of commercial interest from the submarine rises and surrounding waters of the Chilean oceanic islands (southeastern Pacific Ocean)

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ABSTRACT. The Chilean oceanic islands are located in the southeastern Pacific Ocean and include Easter Island, Salas y Gómez Island, Desventuradas Islands (San Félix Island and San Ambrosio Island), and the Juan Fernández Archipelago. They are of volcanic origin and are the emerged peaks of seamounts that form part of the Salas y Gómez and Nazca ranges that rise up from the Nazca tectonic plate. The islands are at a great distance from each other and from the South American continent, and their surrounding areas have depths around 4000 m to the ocean floor. The objective of this study is to update stomatopods and decapods records from these islands, from their surrounding waters and from the seamount ranges of which they are part of. Given that there is little information on some of these sites, and the records are disperse, a literature review is carried out, analysing different sources including both published reports and reports with limited circulation. To date, three families of Stomatopoda with five species and 57 families of Decapoda with 194 species have been recorded. Of this total, three species represent potential resources to develop fisheries and only another three are exploited to differing degrees (*Jasus frontalis*, *Panulirus pascuensis* and *Chaceon chilensis*). Their more relevant aspects, including their exploitation status, are described.

Keywords: Stomatopoda, Decapoda, taxonomical records, exploited crustaceans, Chilean oceanic islands.

Registro de estomatópodos y decápodos, incluyendo la descripción de especies de interés comercial en cordilleras submarinas y aguas circundantes a islas oceánicas chilenas (Océano Pacífico suroriental)

RESUMEN. En la región suroriental del Océano Pacífico se encuentran las islas oceánicas chilenas, que corresponden a Isla de Pascua, Isla Salas y Gómez, Islas Desventuradas (I. San Félix e I. San Ambrosio) y Archipiélago Juan Fernández. Todas son de origen volcánico y corresponden a las cumbres emergidas de montes submarinos que forman parte de las cordilleras Salas y Gómez, y Nazca que se levantan sobre la placa tectónica de Nazca. Estas islas tienen como características comunes estar alejadas entre sí y del continente sudamericano, con profundidades en su entorno, de alrededor de 4.000 m hasta el piso oceánico. El presente trabajo tiene como objetivo actualizar el registro de las especies de Stomatopoda y Decapoda en estas islas, en aguas circundantes y en la cadena de montes submarinos de las que forman parte. Dada la escasa información en algunos de estos lugares y que los registros se encuentran dispersos, se ha efectuado la revisión de literatura proveniente de diferentes fuentes, tanto publicadas como de informes de circulación restringida. A la fecha se han registrado tres familias de Stomatopoda con cinco especies y 57 familias de Decapoda con 194 especies. De este total, tres especies constituyen especies potenciales y otras tres son explotadas con diferente intensidad (*Jasus frontalis*, *Panulirus pascuensis* and *Chaceon chilensis*). Se describen sus aspectos más relevantes y su estado actual de explotación.

Palabras clave: Stomatopoda, Decapoda, registros taxonómicos, crustáceos explotados, islas oceánicas chilenas.

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INTRODUCTION

The sub-basin of the eastern Pacific Ocean comprises the area east of the East Pacific Rise where the centre of expansion gradually creates the Cocos, Nazca and Antarctic plates, moving them in a generally eastern direction. The eastern border of the basin is defined by the South American plate, whose movement towards the west is the result of the expansion of the Mid-Atlantic Ridge (Frutos & Lara, 2010). The macro-region of this large water mass represents one of the least explored areas of the world, with relatively little information on the ocean floors, waters characteristics and dynamics, and of the and the marine flora and fauna that live there. It is also sporadically influenced by the occurrence of the El Niño Southern Oscillation (ENSO).

Crustaceans are a group of invertebrates of great importance to science and taxonomy, and some have economic relevance. In Chilean waters a total of around 400 marine species have been identified between depths of 0 and 6000 m. They have been described and cited in innumerable national and foreign publications (Retamal, 2010). In the southeastern Pacific Ocean, Chile has four island territories of the highest interest to science and other fields, due to their geographic location, geological formation and isolation: Easter Island, Salas y Gómez Island, the Desventuradas Islands (San Félix Island and San Ambrosio Island), and the Juan Fernández Archipelago. They are of volcanic origin and represent the emerged peaks of seamounts that form part of the Salas y Gómez and Nazca ranges on the Nazca tectonic plate.

There is a widespread global increase in concern for research of oceanic biodiversity, aiming to identify species composition and distribution, information that is required before implementing any measures to protect marine ecosystems, many of which are currently considered endangered. On a national level, one of the highest priorities is to establish an inventory of the fauna present in Chilean waters, especially those of the Chilean oceanic islands due to their high degree of endemism resulting from their isolation and from the limited human intervention taking place. The aim of the present review is to contribute to this goal, reporting the decapod and stomatopod species (including those of commercial interest) from these islands, as well as describing the environmental characteristics of each location.

MATERIALS AND METHODS

The available literature (publications, expedition reports, fishing records and technical reports) was used to create the list of stomatopod and decapod species from the Chilean oceanic islands: Easter Island, Salas y Gómez Island, the Desventuradas Islands and the Juan Fernández Archipelago, and the seamount chains to which these islands belong. On the basis of this information, the main characteristics of each island, the species reported and their economic importance was described.

The main publications consulted for Easter Island and Salas y Gómez Island were: Garth (1973), Retamal (1981, 2004), DiSalvo *et al.* (1988); Parin *et al.* (1997), Poupin (2003), Guzmán (2008), Fernández *et al.* (2014), and Boyko & Liguori (2014); for the Juan Fernández Archipelago: Dupré (1975), Andrade (1985), Retamal & Arana (2000), and Palma *et al.* (2004). The references used for Salas y Gómez Island were Retamal & Navarro (1966), Retamal (1999, 2004), Retamal & Gorny (2004), and Fernández *et al.* (2014). The list of fauna from the seamounts was prepared using the contributions of Parin *et al.* (1997) and Poupin (2003). The record for the Desventuradas Islands was obtained from Parin *et al.* (1997) and the "Pristine Seas Expedition" carried out by National Geographic and Oceana in 2014.

The material collected by the first author from Easter Island and Salas y Gómez Island was deposited at the Museum of Zoology of the University of Concepcion, while that of the Juan Fernández Archipelago and the seamount range of this archipelago was deposited at the National Museum of Natural History in Santiago de Chile (Báez & Ruiz, 1985). Other specimens collected during many different expeditions to the waters around Easter Island, Salas y Gómez Island and the seamount ranges in the south-eastern Pacific Ocean can be found in different museums around the world (Poupin, 2003; Fernández *et al*., 2014).

The literature regarding these islands was reviewed to identify species of commercial interest, their current level of exploitation, and any future fishery potential of these species.

THE CHILEAN OCEANIC ISLANDS

The Chilean oceanic islands are small territories located in the southeastern Pacific Ocean far away from the South American mainland (Fig. 1). They are of volcanic origin and are associated with the action of hotspots. These islands are the emerged peaks of seamounts along the Nazca tectonic plate (Díaz-Naveas & Frutos, 2010). The Nazca Plate has a boundary to the north with the Galapagos Rise and to the south with the Chile Rise, to the west, with the accreting ridge of the East Pacific Rise, and to the east with the subduction

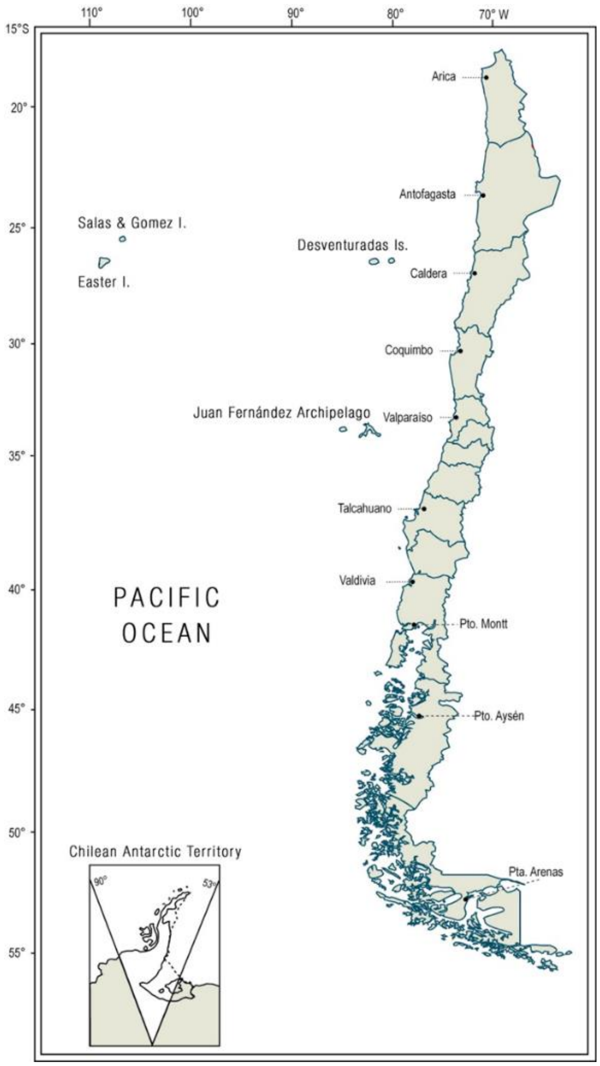

Figure 1. Chilean oceanic islands in the southeastern Pacific Ocean.

line on the Peru-Chile Trench, which separates it from the South-American Plate (Díaz-Naveas & Frutos, 2010).

Easter Island (Fig. 1) is located in the middle of the eastern Pacific Ocean, half way to Polynesia from America. It is therefore considered one of the most isolated islands in the world. It is situated around 400 km from the uninhabited islet of Salas y Gómez and 3700 km from continental Chile. To the west, it is 2250 km from Pitcairn Island and to the east 3140 km separated from the Juan Fernández Archipelago, making it one of the most isolated places in the world. Easter Island, together with New Zealand and the Hawaii Archipelago, are the vertices of a triangle containing the Polynesian Islands.

Easter Island has a triangular shape, with a perimeter of 65 km, an area of 164 km^2, and a maximum height of 400 m, forming part of a long seamount range running eastwards that also includes Salas y Gómez Island (Rodrigo *et al*., 2014).

The Desventuradas Islands (Fig. 1) are an island group made up of San Félix Island, San Ambrosio Island and several islets (González Islet and Peterborough Cathedral). It is on the same seamount range as Easter Island and Salas y Gómez Island, south of the Nazca Ridge, located roughly 850 km from continental South America and 780 km north of the Juan Fernández Archipelago.

The Juan Fernández Archipelago (Fig. 1) is comprised of three volcanic islands: Alejandro Selkirk Island (33º46.9'S, 80º46.1'W) with a surface of 85 km^2 and a maximum height of 1650 m; Robinson Crusoe Island (33º38.9'S, 78º51.7'W) 167 km from the former island, with a surface of 93 km^2 and a maximum height of 915 m; and Santa Clara Island (33º42'S, 78º56.5W) with an area of 5 km^2 and a maximum height of 375 m. The latter is separated from Robinson Crusoe Island by a narrow channel. The island group is formed by emerged peaks of the submarine Juan Fernández rise, which draws a perpendicular line to the central coast of Chile. Robinson Crusoe Island is 670 km from the continent and is the only island of the group that is permanently inhabited. Alejandro Selkirk Island is inhabited only by fishermen from Robinson Crusoe Island during the months of the Juan Fernández lobster fishing season.

The region of the ocean where Easter Island and Salas y Gómez Island are located is approximately the centre of the subtropical gyre of the Pacific Ocean. The surface waters around the island are oligotrophic, with reduced biomass and low primary production (Moraga & Olivares, 1996; Andrade *et al*., 2014a; Von Dassow & Collado-Fabbri, 2014). According to T-S charts, the upper level of the waters around Easter Island is composed by Subtropical Waters (STW) up to a depth of around 300 m, with temperatures between 15 and 27ºC, high salinity between 35.0 and 36.7 (Silva, 1993; Moraga & Olivares, 1996) and oxygen content between 5 and 6 m L^{-1}. Below this water mass and up to a depth of 800 m, there are Antarctic Intermediate Waters (AAIW) with temperatures between 4 and 10ºC, salinity between 34.3 and 34.6, and dissolved oxygen of around 5 m L^{-1} (Reid, 1973; Olivares & Moraga, 1993; Silva, 1993; Moraga & Olivares, 1996; Fuenzalida *et al*., 2007). Below this layer is Deep Pacific Waters (DPW).

The Desventuradas Islands and the Juan Fernández Archipelago are situated close to the eastern edge of the Humboldt Current System. According to the results of 11 oceanographic stations (October 2000) in waters around San Félix Island and San Ambrosio Island

(Moraga & Argandoña, 2001; Schneider *et al*., 2001), the surface layer up to a depth of around 199 m is composed by STW with temperatures between 14 and 17ºC and salinities of 34.6 to 34.8. Below this layer and down to 180 m prevails Subantarctic Waters (SAAW) with temperatures between 10 and 13ºC and salinity of 34.2 to 34.5, followed by Equatorial Subsurface Water (ESSW) with salinity of 34.5 to 34.7 and minimum dissolved oxygen of 1 to 3 m L^{-1} down to a depth of 300 m. Below 400 m, AAIW were found with temperatures between 5 and 10ºC, salinity between 34.5 and 34.5, and dissolved oxygen between 3 and 4 m L^{-1}.

The oceanographic characteristics of the Juan Fernández Archipelago have been studied by Silva & Sievers (1973), Sievers (1975), Silva (1985), Moraga & Argandoña (2001). Between the surface and a depth of 1500 m, four water masses can be distinguished, with clearly differentiated physical and chemical properties that reflect their place of origin. The surface layer is the mass of SAAW, located approximately between 0 and 200 m, with temperatures between 10 and 19ºC, salinity of 34.0 to 34.2, high surface values for dissolved oxygen of 4 to 6 m L^{-1}. Below this water of subantarctic origin and up to a depth of around 400 m, there is ESSW with temperatures varying between 10 and 7ºC, salinity between 34.4 and 34.5, low oxygen content (1-4 m L^{-1}).

Further down, there is the layer of AAIW up to an approximate depth of 1000 m, with low temperatures (7 to 4ºC) and reduced salinity values (34.3-34.4), and a higher dissolved oxygen (3-4 m L^{-1}). Below a depth of 1000 m, there are DPWs, whose temperatures range from 5.9 to 3.5ºC, with relatively higher salinity (34.6-34.7) and lower oxygen content than the layer above (~3.0 m L^{-1}).

The surface waters in this area can experience seasonal alterations due to the southern movement of the mass of STW. According to the results obtained by the cruise ship Juan Fernández II (April 1973), this water mass was found in a surface layer up to a depth of 50 m, moving the mass of SAAW to deeper levels. The apparent anomaly may have been related to the El Niño phenomenon, which was recorded that year with exceptionally marked characteristics along the Peruvian and northern Chilean coasts.

According to (Andrade *et al*., 2012, 2014a, 2014b, 2014c), the region around the Juan Fernández Archipelago is affected by large anticyclonic surface and subsurface eddies, mainly during autumn. The Island Mass Effect occurs around this archipelago (Doty & Ogury, 1956), leading to a local increase of chlorophyll-α as a result of an increase in nutrients due to the combined effect of mesoscale eddies and the topography of the islands (Andrade *et al*., 2014c).

SPECIES RECORD

The nomenclature used for the locations where species were recorded is as follows: EI = Easter Island, SG = Salas and Gómez Island, DI = Desventuradas Islands (San Félix Island and San Ambrosio Island), and JFA = Juan Fernández Archipelago (Robinson Crusoe, Santa Clara and Alejandro Selkirk Islands). Each area is considered to include the seamounts around the islands in question. The taxonomic order was performed following De Grave *et al.* (2009). In the taxonomic list below we indicated for each species its author, followed by the main documents in which the species is described in the area indicated.

Class Malacostraca
Subclass Hoplocarida
Order Stomatopoda
Family Odontodactylidae

Odontodactylus hawaiiensis Manning, 1967. (DiSalvo *et al*., 1988; Retamal, 2002; Poupin, 2003). EI, SG.

Family Pseudoquillidae

Pseudoquilla oculata (Brullé, 1837). (DiSalvo *et al*., 1988; Manning, 1995; Poupin, 2003). EI.
Raoulserenea oxyrhyncha (Borradaile, 1898). (Gravier, 1936; Manning ,1995; Poupin, 2003). EI.

Family Gonodactylidae

Hemisquilla ensiger (Owen, 1832). (Bahamonde, 1968; Retamal, 1981). JF.
Pseudoquillospsis (Pseudoquillopsis) lessoni (Guérin, 1830). (Bahamonde, 1968). JF.

Order Decapoda
Suborder Dendrobranchiata
Family Aristeidae

Aristaeomorpha foliacea (Risso, 1827). (Parin *et al*., 1997; Guzmán, 2008). SG.

Family Benthesycimidae

Benthogennema pasithea (De Man, 1907). (Vereshchaka, 1990; Guzmán, 2008). SG.
Benthesicymus investigatoris Alcock & Anderson, 1899. (Parin *et al*., 1997). SG.
Gennadas barbari Vereshchaka, 1990. (Guzmán, 2004). SG, EI.
Gennadas brevirostris Bouvier, 1905. (Guzmán, 2004, 2008). JF.
Gennadas gilchristi Calman, 1925. (Guzmán, 2004, 2008). EI.
Gennadas incertus (Balss, 1927). (Guzmán & Wicksten, 2000; Guzmán, 2008). SG.
Gennadas propinquus Rathbun, 1906. SG.
Gennadas scutatus Bouvier, 1906. (Retamal, 1981). SG.
Gennadas tinayrei Bouvier, 1906. (Guzmán, 2004, 2008). JF.

Family Penaeidae
Metapenaeopsis stockmani Burukovsky, 1990. (Parin *et al*., 1997; Poupin, 2003). SG, EI.

Family Solenoceridae
Hadropenaeus lucassi (Bate, 1881). (Burukovsky, 1990; Parin *et al*., 1997). SG**.**
Hymenopenaeus halli Bruce, 1966. (Burukovsky, 1990). SG.

Family Sicyoniidae
Sicyonia nasica Burukovsky, 1990. (Parin *et al*., 1997; Poupin, 2003). SG.

Family Sergestidae
Allosergestes pectinatus (Sund, 1920). (Guzmán, 2003, 2004, 2008). EI, SG.
Deosergestes corniculum (Kröyer, 1855). (Vereshchaka, 1990; Guzmán, 2008). SG.
Neosergestes brevispinatus (Judkins, 1978). (Vereshchaka, 1990; Guzmán, 2008). SG.
Neosergestes consobrinus (Milne, 1968). (Guzmán, 2003; Poupin, 2003). EI.
Parasergestes extensus (Hamamura, 1983). (Guzmán, 2003). SG.
Parasergestes hallia (Faxon, 1893). (Vereshchaka, 1990; Guzmán, 2008). SG.
Sergestes cornutus Kröyer, 1855. (Vereshchaka, 1990). SG.
Sergestes gibbilobatus Judkins, 1978. (Vereshchaka, 1990). SG.
Sergestes atlanticus H. Milne Edwards, 1830. (Vereshchaka, 1990). SG.
Sergestes pestafer Burkenroad, 1937. (Vereshchaka, 1990; Guzmán, 2003). SG.
Sergia bigemmea (Burkenroad, 1940). (Guzmán, 2003). SG.
Sergia gardineri (Kemp, 1913). (Vereshchaka, 2000, Poupin, 2003). SG.
Sergia potens (Burkenroad, 1940). (Vereshchaka, 1990; Poupin, 2003). SG.
Sergia regalis (Gordon, 1939). (Vereshchaka, 2000: Poupin, 2003). SG.
Sergia scintillans (Burkenroad, 1940). (Vereshchaka, 2000). SG.
Sergestes vigilax Stimpson, 1860. (Vereshchaka, 1990). SG.

Suborder Pleocyemata
Infraorder Stenopodidea
Family Spongicolidae
Spongicola parvispina Zarenkov, 1990. (Parin *et al*., 1997). SG.

Family Stenopodidae
Stenopus hispidus (Olivier, 1811). (DiSalvo *et al*., 1988; Retamal, 2004). EI.

Infraorden Caridea
Family Pasiphaeidae
Pasiphaea americana Faxon, 1893. (Burukovsky, 1990; Vereshchaka, 1990; Parin *et al*., 1997). SG.
Pasiphaea chacei Yaldwyn, 1962. (Vereshchaka, 1990; Guzmán, 2008). SG.
Pasiphaea cristata Bate, 1888. (Vereshchaka, 1990; Guzmán, 2008). SG.
Pasiphaea flagellata Rathbun, 1906. (Burukovsky, 1990; Parin *et al*., 1997). SG.
Pasiphaea kaiwiensis Rathbun, 1906. (Vereshchaka, 1990). SG.

Family Acanthephyridae
Acanthephyra cucullata Faxon, 1893. (Vereshchaka, 1990; Guzmán, 2008). SG.
Acanthephyra curtirostris Wood Mason, 1891. (Vereshchaka, 1990; Guzmán, 2004). SG.
Acanthephyra eximia Smith, 1884. (Burukovsky, 1990; Parin *et al.*, 1997). SG.
Acanthephyra trispinosa Kemp, 1939. (Vereshchaka, 1990; Guzmán, 2008). SG.
Ephyrina hoskynii Wood-Mason, 1891. (Vereshchaka, 1990; Guzmán, 2008). SG.
Ephyrina ombago Crosnier & Forest, 1973. SG.
Meningodora mollis Smith 1892. (Vereshchaka, 1990). SG.
Notostomus elegans A. Milne Edwards, 1881. (Vereshchaka, 1990; Retamal & Ulloa, 2015). SG.
Systellaspis cristata (Faxon, 1893). (Vereshchaka, 1990). SG.
Systellaspis debilis A. Milne Edwards, 1881. (Vereshchaka, 1990). SG.

Family Oplophoridae
Oplophorus gracilirostris A. Milne Edwards, 1881. (Vereshchaka, 1990). SG.
Oplophorus spinosus (Brullé, 1839). (Burukovsky, 1990; Vereshchaka, 1990; Parin *et al*., 1997; Guzmán, 2004). EI, SG.

Family Disciadidae
Discias pascuensis Fransen, 1987. (DiSalvo *et al.*, 1988). EI.
Discias serrifer Rathbun, 1902. (Arana *et al.*, 1976; Andrade, 1985). JF.

Family Nematocarcinidae
Nematocarcinus gracilis Bate, 1888. (Burukovsky, 1990; Poupin, 2003). SG.
Nematocarcinus pseudocursor Burukovsky, 1990. (Parin *et al*., 1997; Poupin, 2003). SG.

Family Rhynchocinetidae
Rhynchocinetes balsii Gordon, 1936. (Bahamonde, 1965; Holthuis, 1972; Arana *et al.*, 1976; Retamal, 1981; DiSalvo *et al*., 1988). EI, DI, JF.

Family Stylodactylidae
Stylodactylus pubescens Burukovsky, 1990. (Parin *et al*., 1997; Poupin, 2003). SG (25º04'-25º09'S, 96º18'-97ª26'W).

Family Gnathopyllidae
Gnathopyllum americanum Guérin, 1837. (Fransen, 1987; DiSalvo *et al*., 1988). EI.

Family Palaemonidae
Brachycarpus biunguiculatus (Lucas, 1846). (Holthuis, 1972: Retamal, 1981; DiSalvo *et al*., 1988; Poupin, 2003). EI.
Cuapetes rapanui Fransen, 1987. (DiSalvo *et al*., 1988). EI.
Harpiliopsis beaupressi (Audouin, 1826). (Holthuis, 1972; Retamal, 1981; Poupin, 2003). EI.
Leander sp. in Vereshchaka, 1990. (Poupin, 2003). SG.
Palaemonella disalvoi Fransen, 1987. (DiSalvo *et al*., 1988). EI.
Palaemonella spinulata Yokoya, 1936. (DiSalvo *et al*., 1988). EI.
Periclimenes alcocki Kemp, 1922. (Burukovsky, 1990; Parin *et al*., 1997). SG.
Periclimenes sp. in Vereshchaka, 1990. (Retamal & Gorny, 2004). EI, SG.

Family Alpheidae
Alpheopsis chilensis Coutière, 1896. (Arana *et al*., 1976; Retamal, 1981). JF.
Alpheopsis equalis Coutière, 1896. (DiSalvo *et al*., 1988; Poupin, 2003). EI.
Alpheus chilensis Coutière, 1902. (Retamal, 1981, 2004). EI.
Alpheus collumianus Stimpson, 1860. (DiSalvo *et al*., 1988; Poupin, 2003). EI.
Alpheus crockeri (Amstrong, 1941). (DiSalvo *et al*., 1988; Poupin, 2003). EI.
Alpheus lanceostylus Banner, 1959. (DiSalvo *et al*., 1988; Poupin, 2003). EI.
Alpheus lottini Guérin-Meneville, 1829. (Fransen, 1987; DiSalvo *et al*., 1988; Retamal & Navarro 2001) (sic); Poupin, 2003; Retamal, 2004; Retamal & Navarro, 2001). EI.
Alpheus pacificus Dana, 1852. (DiSalvo *et al*., 1988; Poupin, 2003). EI.
Alpheus romensky Burukovsky, 1990. (Parin *et al*., 1997). SG.
Athanas ¿ marshallensis Chace, 1955. (DiSalvo *et al*., 1988; Poupin, 2003). EI.
Metabetaeus minutus (Whitelegge, 1897). (Saavedra *et al*., 1996). EI.
Metalpheus paragracilis (Coutière, 1897). (DiSalvo *et al*., 1988, Poupin, 2003). EI.
Metalpheus rostratipes (Pocock, 1890). (DiSalvo *et al*., 1988; Crosnier & Forest, 1966; Poupin, 2003). EI.
Synalpheus ¿ paraneomeris Coutière, 1905. (DiSalvo *et al*., 1988; Poupin, 2003). EI.
Synalpheus tumidomanus (Paulson, 1875), (DiSalvo *et al*., 1988; Poupin, 2003). EI.

Family Hippolytidae
Hippolyte sp. in Fransen, 1987. (DiSalvo *et al*., 1988; Poupin, 2003). EI.
Lysmata trisetacea (Heller, 1861). (Holthuis, 1972; Retamal, 1981). EI (Rano Raraku, Vaihu).
Thor amboiensis (De Man, 1888). (Fransen, 1987; DiSalvo *et al*., 1987; Poupin, 2003). EI (Hanga Roa, Moto Tautara, Tahai, Motu Nui).
Thor spinosus Boone, 1935. (Fransen, 1987; DiSalvo *et al*., 1988; Poupin, 2003). EI (west coast of Tahai, Motu Tautara).

Family Processidae
Processa pygmaea Burukovsky, 1990. (Parin *et al*., 1997). SG.

Family Pandalidae
Heterocarpus laevigatus Bate, 1888. (Burukovsky, 1986, 1990; Poupin, 2003). SG.
Heterocarpus sibogae De Man, 1917. (Burukovsky, 1990; Parin *et al*., 1997). SG.
Pandalina nana Burukovsky, 1990. (Parin *et al*., 1997; Poupin, 2003). SG.
Plesionika edwardsii (Brandt, 1851). (DiSalvo *et al*. 1988; Burukovsky, 1990; Parin *et al.*, 1997). EI, SG.
Plesionika ensis A. Milne Edwards, 1881. (Burukovsky, 1990; Parin *et al*., 1997; Poupin, 2003). SG.
Plesionika fenneri Crosnier, 1986. (Burukovsky, 1990; Parin *et al*., 1997; Poupin, 2003). SG.
Plesionika ocellus (Bate, 1888). (Burukovsky, 1990; Parin *et al.*, 1997). SG.
Plesionika williamsi Forest, 1964. (Burukovsky, 1990; Parin *et al*., 1997; Poupin, 2003). SG.

Family Crangonidae
Pontocaris rathbuni (De Man, 1918). (Burukovsky, 1990; Parin *et al*., 1997). SG (25º04'S-97º26'W).
Pontophilus gracilis junceus Bate, 1888. (Burukovsky, 1990; Parin *et al.*, 1997). SG (24º58'-25º07', 88º31'-99º35'W).
Pontophilus nikiforovi Burukovsky, 1990. (Parin *et al.*, 1997). SG (25º03'S-97º27'W).
Pontophilus? in Vereshchaka, 1990. **SG** (25º04S-97º26'W).

Family Glyphocrangonidae
Glyphocrangon wagini Burukovsky, 1990. (Parin *et al.*, 1997). SG (24º56'-25º33'S, 88º31'-99º35'W).

Infraorder Thalassinidea
Family Callianassidae
Callianassa sp. *in* Vereshchaka, 1990. SG (25º04'S-97º26'W).
Rayllianassa amboinensis (de Man, 1888). EI.

Infraorder Palinura
Family Polychelidae
Stereomastis surda Galil, 2000. (Poupin, 2003). SG.

Family Palinuridae
Jasus frontalis (H. Milne Edwards, 1837). (Arana *et al*., 1976; Retamal, 1981; Arana *et al*., 1985). JF, DI.
Panulirus pascuensis Reed, 1954. (Holthuis, 1972; Retamal, 1981; DiSalvo *et al*., 1988; Poupin, 2003). EI, SG.
Projasus bahamondei George, 1976. (Retamal, 1981; Rudjakov *et al.*, 1990; Parin *et al.*, 1997; Poupin, 2003). SG, JF, DI.

Family Scyllaridae
Acantharcturus delfíni (Bouvier, 1909). (Holthuis, 1967; Arana *et al*., 1976; Retamal, 1981; Andrade, 1985; Palma *et al.*, 2004). JF.
Arctides regalis Holthuis, 1963. (DiSalvo *et al.*, 1988; Retamal, 2000; Poupin, 2003). EI.
Parribacus perlatus Holthuis, 1967. (Retamal, 1981; DiSalvo *et al*., 1988; Poupin, 2003). EI.
Scyllarides rogeenveeni Holthuis, 1967. (Retamal, 1981; DiSalvo *et al.*, 1988; Poupin, 2003). EI.

Infraorder Anomura
Family Galatheidae
Phylladiorhynchus integrirostris (Dana, 1853). (Di Salvo *et al*., 1988; Baba, 1991; Poupin, 2003). EI.

Family Munididae
Munida sp. in Vereshchaka, 1990. (Poupin, 2003). SG (24º40'-25º58'S, 85º28'-100º41'W).

Family Porcellanidae
Petrolisthes coccineus (Owen, 1839). (Báez & Ruiz, 1985). EI.
Petrolisthes extremus Kropp & Haig, 1994. (Poupin, 2003). EI (Anakena, Motu Iti).
Petrolisthes granulosus (Guérin, 1835). (Retamal, 1981; Andrade, 1985). JF.

Family Albuneidae
Albunea bulla Boyko, 2002. (Poupin, 2003). EI.

Family Diogeneidae
Calcinus imperialis Whitelegge, 1901. (DiSalvo *et al.*, 1988; Poupin, 2003). EI.
Calcinus pascuensis Haig, 1974. (Haig, 1974; Retamal, 1981; DiSalvo *et al*., 1988; Poupin, 2003). EI.
Calcinus vachoni Forest, 1958. (Poupin, 2003; Retamal & Moyano, 2010). EI.

Family Paguridae
Porcellanopagurus foresti Zarenkov, 1990. (Parin *et al.*, 1997; Poupin, 2003; Retamal & Moyano, 2010)**.** SG (25º40'S, 85º27'W).
Porcellanopagurus platei Lenz, 1902. (Arana *et al.*, 1976; Retamal, 1981; Andrade, 1985). JF.
Pylopaguropsis garciai McLaughlin & Haig, 1989. (DiSalvo *et al*., 1988; Poupin, 2003). EI.

Family Parapaguridae
Oncopagurus haigae (de Saint Laurent, 1972). In Retamal & Gorny (2004) as *Oncopagurus* sp. JF.
Oncopagurus cf. haigae (de Saint Laurent, 1972). (Zhadan, 1997; Poupin, 2003). SG.
Oncopagurus mironovi Zhadan, 1997. SG.
Oncopagurus stockmani Zhadan, 1997. SG.
Paragiopagurus boletifer (de Saint Laurent, 1972). (Zarenkov, 1990; Parin *et al.*, 1997; Zhadan, 1997; Poupin, 2003). SG.
Parapagiopagurus ruticheles (A. Milne Edwards, 1891). (Zhadan, 1997; Poupin, 2003). SG.
Parapagiopagurus wallisi (Lemaitre, 1994). (Zhadan, 1997; Poupin, 2003). SG.
Parapagurus holthuisi Lemaitre, 1989. JF.
Strobopagurus aff. gracilipes (A. Milne Edwards, 1891). (Zhadan, 1997; Poupin, 2003). SG.
Sympagurus affinis (Henderson, 1888). (Parin *et al.*, 1997; Zhadan, 1997; Poupin, 2003). SG.
Sympagurus dofleini (Balss, 1912). (Zarenkov, 1990; Zhadan, 1997; Poupin, 2003). SG.
Tylaspis anomala Henderson, 1888. (Lemaitre, 1988). EI (19º11'S, 102º24'W).

Infraorder Brachyura
Family Dromiidae
Lauridromia dehaani (Rathbun, 1923). (Zarenkov, 1990; Parin *et al.*, 1997; Poupin, 2003). SG (25º40'S, 85º27'W).
Lewindromia unidentata (Rüppel, 1830). (Garth, 1973; Retamal, 1981; Poupin, 2003). EI (Anakena).

Family Dynomenidae
Dymomenidae sp. DiSalvo *et al.* (1987), (Poupin, 2003). EI.

Family Homolidae
Homologenus orientalis Zarenkov, 1990. (Guinot & Richer de Forges, 1995; Parin *et al.*, 1997; Poupin, 2003). SG (25º07.9'S, 99º26.8'W).
Paromola rathbunae Porter, 1908. (Arana *et al.*, 1976; Retamal, 1981; Zarenkov, 1990; Retamal & Arana, 2000). SG, DI, JF.

Family Latreillidae
Latreillidae sp. (DiSalvo *et al.*, 1988; Poupin, 2003). EI.
Latreilla metanesa Williams, 1982. (Zarenkov, 1990; Parin *et al.*, 1997; Poupin, 2003). SG.

Family Calappidae
Calappidae sp. (DiSalvo *et al.*, 1988). (Poupin, 2003). EI.
Mursia gaudichaudii (H. Milne Edwards, 1837). (Zarenkov, 1990; Galil, 1993; Parin *et al.*, 1997; Retamal *et al*., 2013). SG, JF.

Family Leucosiidae
Ebalia sculpta Zarenkov, 1990. (Parin *et al.*, 1997). SG.
Randallia nana Zarenkov, 1990. (Parin *et al.*, 1997). SG.

Family Majidae
Majidae spp. DiSalvo *et al.* (1997). EI.
Ageitomaia baeckstroemi (Balss, 1924). (Retamal, 1981, 2004; Poupin, 2003). SG.

Family Inachidae
Cyrtomaia danielae Zarenkov, 1990. (Parin *et al.*, 1997). SG.
Cyrtomaia platypes Yokoya, 1933. (Zarenkov, 1990; Parin *et al.*, 1997). SG.

Family Epialtidae
Huenia pacifica Miers, 1979. (Poupin, 2003; Retamal, 2004). SG.

Family Hymenosomatidae
Hymenosomatidae sp. (DiSalvo *et al.*, 1997). (Poupin, 2003). EI.

Family Parthenopidae
Daldorfia horrida (Linné, 1758). (Garth, 1985; DiSalvo *et al.*, 1988; Poupin, 2003). EI.
Garthambrus allisoni (Garth, 1993). (Ng, 1996; Poupin, 2003). SG.
Garthambrus mironovi (Zarenkov, 1990). (Garth, 1993; Parin *et al.*, 1997). SG.
Heterocrypta epibranchialis Zarenkov, 1990. (Parin *et al.*, 1997). SG.

Family Atelecyclidae
Atelecyclidae sp. (DiSalvo *et al.*, 1988). EI.

Family Geryonidae
Chaceon chilensis Chirino-Gálvez & Manning, 1989. (Retamal, 1981; Zarenkov, 1990; Retamal & Arana, 2000). SG, DI, JF.

Family Portunidae
Portunidae (7) spp. (DiSalvo *et al.*, 1988). (Poupin, 2003). EI.
Laleonectes nipponensis Sakai, 1938. (Bokyo & Linguori, 2014). EI
Ovalipes elongatus Stephenson & Rees, 1968. (Bokyo & Linguori, 2014). EI
Ovalipes trimaculatus (de Haan, 1833). (Retamal, 1981; DiSalvo *et al.*, 1988). JF, EI.
Portunus pubescens (Dana, 1852). (Garth, 1973). EI.
Thalamita auauensis Rathbun,1906. (Bokyo & Linguori, 2014). EI.
Thalamita bevisi (Stebbing, 1921). (Retamal,1999, 2004; Poupin, 2003). SG.
Thalamita seurati Nobili, 1906. (Bokyo & Linguori, 2014). EI.

Family Carpiliidae
Carpilius convexus (Forskäl, 1775). (Garth, 1973; Retamal, 1981, 2004). EI.

Family Goneplacidae
Progeryon mararae Guinot & Richer de Forges, 1981. (Zarenkov, 1990; Parin *et al.*, 1997). SG.

Family Trapeziidae
Trapezia areolata Dana, 1852. (Garth, 1973; Retamal, 1981; Castro, 1997; Poupin, 2003). EI.
Trapezia bidentata (Förskall, 1775). (Retamal, 1981; Garth, 1985; Poupin, 2003). EI (La Pèrouse).
*Trapezia cymodoce (*Herbst, 1801). EI.
Traezia danai Ward, 1939. (Garth, 1973; Retamal, 1994). EI.
Trapezia punctimanus Odinetz, 1984. (Rathbun, 1907; Poupin, 2003). EI.
Trapezia tigrina Eydoux & Souleyet, 1842. (Garth, 1973; Retamal, 1981; Poupin, 2003). EI.

Family Xanthidae
Actaea allisoni Garth, 1985. (Poupin, 2003). EI.
Banareia parvula (Krauss, 1843). (Garth, 1973; Retamal, 1981; Poupin, 2003). EI.
Chlorodiella cytherea (Dana, 1852). (Garth, 1973; Retamal, 1981, 2004). EI, SG.
Etisus electra (Herbst, 1801). (Garth, 1973; Retamal, 1981). EI (Bahía Anakena).
Forestia pascua Garth, 1985. (Poupin, 2003). EI (Bahía La Pèrouse).
Liomera laperoussi Garth, 1985. (Poupin, 2003). EI (Bahía La Pèrouse).
Liomera monticulosa (A. Milne Edwards, 1873). (Garth, 1985; Poupin, 2003). EI (Bahía La Pèrouse).
Liomera rugata (A. Milne Edwards, 1865). (Garth, 1973; Retamal, 1981; Poupin, 2003). EI (Hotu Iti).
Lophozozymus dodone (Herbst, 1801). (Garth, 1973; Retamal, 1981, 2004). EI (Bahía Anakena).
Monodaeus pettersoni Garth, 1985. (Poupin, 2003). EI (Bahía La Pèrouse).
Platepistoma balssii (Zarenkov, 1990). (Parin *et al.*, 1997; Poupin, 2003). SG.
Pseudoliomera remota (Rathbun, 1907). (Garth, 1973; Retamal, 1981, 2004). EI.
Xanthidae spp. (8). (DiSalvo *et al.*, 1988). (Poupin, 2003). EI.

Family Pilumnidae
Pilumnus sp. Retamal (2004). SG.

Family Cryptochiridae
Cryptochiridae spp. (2). (DiSalvo *et al.*, 1988; Poupin, 2003). EI.

Family Pinnotheridae
Pinnotheridae spp. ? (DiSalvo *et al.*, 1988). EI.

Family Grapsidae

Geograpsus crinipes (Dana, 1851). (Garth, 1973; Retamal, 1981; Poupin, 2003). EI.

Grapsus grapsus (Linnaeus, 1758). Arana *et al.*, 1976; Retamal, 1981). JF.

Leptograpsus variegatus (Fabricius, 1793). (Bahamonde, 1965; Garth, 1973; (Arana *et al.*, 1976; Retamal, 1981). EI, DI, JF.

Pachygrapsus transversus (Gibbes, 1850). (Rathbun, 1907; Garth, 1973; Retamal, 1981). EI.

Family Varunidae

Cyclograpsus longipes Stimpson, 1858. (Garth, 1973; Retamal, 1981). EI (Vaihu).

Ptychograpsus easteranus Rathbun, 1907. (Garth, 1973; Retamal, 1981; Poupin, 2003). EI.

Family Percnidae

Percnon pascuensis Retamal, 2002. (Poupin, 2003). EI.

Family Plagusiidae

Guinusia chabrus (Linnaeus, 1758). (Retamal, 1981; Báez & Ruiz, 1985; Poupin, 2003). EI, JF.

Guinusia dentipes (de Haan, 1835). (Rathbun, 1907; Garth, 1973; Retamal, 1981; Poupin, 2003). EI.

Plagusia integripes Garth, 1973. (Retamal, 1981; Poupin, 2003). EI.

CRUSTACEANS OF COMMERCIAL INTEREST

Jasus frontalis (Fig. 2)

International name: Juan Fernández spiny rock lobster

Local name: Langosta de Juan Fernández.

Distribution: Around the islands of JFA and the DI, at depths between 0 and 200 m (Holthuis, 1991; Retamal & Arana, 2000; Navarrete, 2012).

General species background: It is the most important marine resource of the JFA, because the main economic activity on these islands is based on the exploitation of this resource. Since the end of the 19th century, this species has been continuously extracted by fishers on Robinson Crusoe Island, who travel each year to Alejandro Selkirk Island and sporadically to San Félix Island and San Ambrosio Island to exploit this species.

The fishing operations include around 140 fishers, using around 60 boats (7 to 9 m in length), some of which are made of wood and others of fibreglass and fitted with outboard motors. The species is caught with wooden traps, which are rectangular (140x80x40 cm) and baited with local fish. Normally, 35-30 traps are used per boat and they are checked every 24-72 h, mainly depending on the weather conditions.

The landing statistics for the last 65 years from the Desventuradas Islands show pronounced annual variations, caused by natural changes in abundance, environmental factors that affect the larval cycle, *puerulus* settlements and recruitment, weather conditions that influence fishing activities and volumes extracted. After several years of persistent decreases in landing figures, since 2005 the numbers began to increase notably, reaching values above 75 ton year^{-1} in recent years (SERNAPESCA, 2000-2014).

Figure 2. Juan Fernández spiny rock lobster (*Jasus frontalis*).

Captured rock lobsters are kept alive in floating nurseries until they are transported to the continent either by sea (Alejandro Selkirk Island, Robinson Crusoe-Santa Clara Islands, Desventuradas Islands) or by air (Robinson Crusoe Island). They are sold live and their main export destinations are the markets in Europe and more recently in China.

Fishery management: The first measures towards regulation of this industry were put into place at the beginning of the last century, representing one of the oldest fishery managed in Chile. The species is currently protected by the following measures: a) safeguards on young individuals, limiting the sale of any specimen measuring less than or equal to 115 mm from the base of the antenna to the lower edge of the shell; b) protection during the reproduction period, prohibiting the capture of lobsters carrying eggs and individuals below the minimum legal length, which must be returned immediately to the sea in the same place where they were captured; c) closed seasons, prohibiting any lobster fishing on the JFA between May 15th and September 30th of each year, and on the DI from June 1st to September 30th of each year; d) to hold, transport or sell any individuals of this species during the closed season, the catches must be declared before May 15th and sold fresh until to September 20th of the same year; e) to avoid interaction between different fishing methods, the only apparatus authorized for the capture of this species are traps; and f) registration of new fishers at the Artisanal Register of the Region of Valparaíso and Oceanic Islands is temporarily suspended for all categories of the section "Juan Fernández lobster fishing", because the resource reached at these islands a level of full exploitation.

Others remarks: In 2011, the National Institute of Industrial Patents (INAPI) included *Jasus frontalis* in the category Geographic Indication, recognizing the species as exclusive to the JFA and the DI (Arana, 2011). In 2014, the fisheries of this species for Robinson Crusoe-Santa Clara, Alejandro Selkirk and the Desventuradas Islands were certified by the Marine Stewardship Council (Arana & Scott, 2014). This certification is the first in Chile and one of the few artisanal operations, which obtained it in Latin America.

Projasus bahamondei (Fig. 3)

International name: Chilean jagged lobster

Local name: Langosta enana

Distribution: This species is found in abundance on the Nazca Submarine Ridge, especially east of 84°W, off Peru (Prosvirov, 1990; Rudjakov *et al*., 1990; Parin *et al*., 1997) where it has been commercially fished by industrial vessels (Arana & Venturini, 1991; Parin *et al*., 1997). This lobster is also found on the DI, on the seamounts of the JFA (George & Grindley, 1964; Dupré, 1975; George, 1976; Retamal, 1981, 1994; Andrade, 1985; Báez & Ruiz, 1985; Retamal & Arana, 2000), and on the O'Higgins Seamount (39°55'S, 73°52'W) off the central coast of Valparaiso, Chile (Báez & Weinborn, 1983). Additional but sporadically reports stem from off the Chilean coastal mainland, approximately between Huasco (28º28'S) and Constitución (35°20'S) (Andrade & Báez, 1980; Retamal, 1981, 1994; Andrade, 1987).

On the Nazca Ridge, this species has been recorded between 225 and 420 m (Arana & Venturini, 1991; Arana & Soto, 1994; Parin *et al*., 1997; Arana, 2014a), and around Robinson Crusoe and Santa Clara at depths of 250 m (Arana & Vega, 2000). In the South American continental slope, the bathymetric range inhabited by this species is between 175 and 550 m (Dupré, 1975; Andrade & Báez, 1980; Báez & Weinborn, 1983).

General species background: This species has been exploited for several years in the region to the east of the Nazca Ridge using former USSR boats and by a

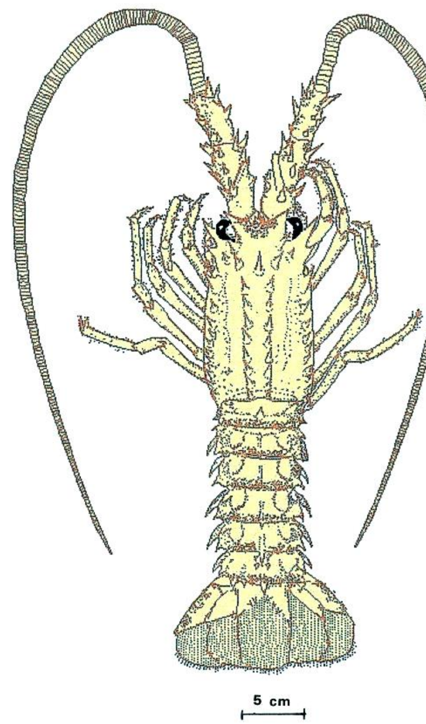

Figure 3. Chilean jagged lobster (*Projasus bahamondei*).

Chilean-Russian company in 1990 and 1991 (Parin *et al*., 1997). Subsequently, another Chilean company obtained for a full year good results in the same region (Arana & Venturini, 1991; Arana & Soto, 1994). Since these fishing operations must take place far away from the coast, the extraction requires the use of factory ships for the conservation and transport of the catches.

Attempts have also been made to develop artisanal fishing with this species at certain locations at the coast of central Chile (Arancibia, 2001). Despite of acceptable results obtained by experimental and exploratory fishing operations with a fleet of artisanal fishing boats, the costs of exploitation and the low abundance impeded a development of permanent fishing operations with this species.

In February 2013, an expedition (National Geographic & Oceana, 2014) discovered the presence of this species around San Ambrosio Island (DI) at depths between 286 to 400 m, on rock and sand sea beds. The concentrations observed from a submarine make this lobster species a potential resource, though more information is required to determine its actual abundance and exploitation feasibility.

Fishery management: No administrative regulation measures are in place.

Chaceon chilensis (Fig. 4)

International name: Juan Fernández golden crab

Local name: Cangrejo dorado de Juan Fernández

Distribution: This crab inhabits the waters around the JFA and the DI. Some individuals of this species have been seen also off Zapallar and Quintero, at the central coast of continental Chile (Andrade & Báez, 1980; Andrade, 1987; Báez & Andrade, 1987), while Parin *et al*. (1997) reported the presence of *C. chilensis* on the Nazca submounts, mainly east of 90ºW.

The depths at which the golden crab lives can vary depending on the area: around Robinson Crusoe and Santa Clara: between 100 and 1000 m (Arana, 2000a; Retamal & Arana, 2000); on the Nazca submounts: between 420 and 800 m (Parin *et al*., 1997).

General species background: The first concrete evidence of the existence of the golden crab on the Juan Fernández seamounts was obtained during the Mar Chile IX expedition, when some specimens were collected by exploratory fishing operations using traps. However, the actual importance of this species was identified during 1996 and 1997 as a result of an exploratory fishing campaign conducted by the Pontificia Universidad Católica de Valparaíso around Robinson Crusoe and Santa Clara (Arana, 2000a, 2000b; Arana & Vega, 2000). The abundance estimated around the islands and the large size of the individuals caught resulted in the classification of this crab as a potential resource, making it a real option for exploitation by the fishers on this archipelago.

The exploitation of *C. chilensis* is carried out by a small number of fishers (20) and boats (10), either during the closed season of the Juan Fernández spiny rock lobster (*Jasus frontalis*) or parallel to lobster fishing operations, alternating between each species. However, due to the increased loss of fishing equipment as a result of operating further from the island and at greater depths than those required to catch the lobster, many fishers consider the extraction of the golden crab to be risky and more costly.

The species is caught using rectangular traps (140x80x40 cm) baited with local fish species, similar to the method used to catch lobster on the same islands. Each boat uses from 8 to 12 traps, which are inspected every 2 to 4 days, depending on the climate conditions.

The development of this new fishing operation brings a need for changes to the extraction system. The bathymetric distribution of the resource (at depths greater than 400 m) implies the need to equip boats with mechanical or hydraulic turning equipment to facilitate fishing operations and the use of GPS to determine the location of fishing grounds and to make sailing safer. These technological developments have been also applied to the Juan Fernández spiny rock lobster fishing operations.

Figure 4. Juan Fernández golden crab (*Chaceon chilensis*).

According to official statistics on landings (SERNAPESCA, 2000-2014), the development of golden crab fishing in Juan Fernández began in 2000, recording catches totalling 13 ton. The amount extracted increased in subsequent years, peaking in 2004 with 49 ton. In recent years a sharp drop in landing figures have been observed, with no recorded landings since 2009. The catches are made mainly on Robinson Crusoe Island, and the frozen crab meat is sold, while a small number of *C. chilensis* is transported alive to the continent for sale.

Fishery management: Though authorities have not set a minimum length for landing, there is a local voluntary rule to use only specimens with a carapace length of around 114 mm.

Others remarks: In 2012, this species was included by the National Institute of Industrial Patents (INAPI) in the category of Geographic Indication, recognizing it as exclusive to the JFA and the DI (Arana, 2012).

Panulirus pascuensis (Fig. 5)

International name: Easter Island lobster

Local name: Langosta de Isla de Pascua or "*ura*" (Rapa Nui name)

Distribution: This species is distributed in shallow waters (depths of 0-10 m) around EI, SG and Pitcairn in the southern Pacific Ocean.

General species background: Extraction of this species was conducted by ancient Rapa Nui islanders by underwater diving during the day or by attracting them with torches at night (Arana, 2014b). The introduction of traps began in 1953 when they were first brought from the JFA. However, for many years individual divers caught these lobsters, rapidly decreasing the population by overfishing.

Though this resource is commonly caught on EI, there are no reliable statistics on the catch volume. In

Figure 5. Easter Island lobster or "*ura*" (*Panulirus pascuensis*).

Figure 6. Crayfish or "*rape rape*" (*Parribacus perlatus*).

the mid-70s, around 7.5 ton year^{-1} were caught, most of which were consumed in hotels on the island. A few years later, a clear decrease in the size of individuals of this species was observed, which coincided with reduced

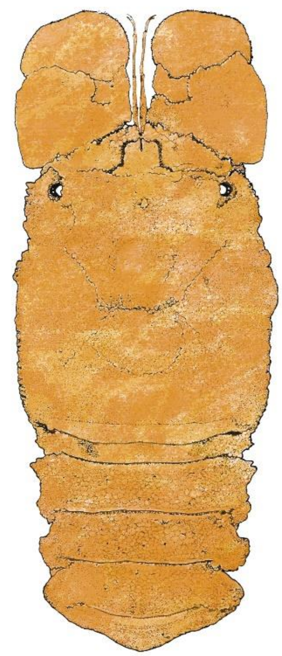

Figure 7. Crayfish or "*ura rape rape"* (*Scyllarides rogeenveeni*). Figure redrawn from Holthuis (1991).

landings. The species is currently fished for local consumption only; the fishing is carried out by 15 fishers using diving and traps.

Fishery management: Since 1979, a closed season (November 1st to March 1st of each year) has been established for Easter Island lobster fishery. Landings are also restricted to a carapace length of over 10 cm. It is prohibited to catch impregnated females or any female with visible eggs, which, if caught, must be returned to the sea at the place of capture.

Together with the aforementioned measures, it is also prohibited to extract the lobsters by independent diving or through the use of nets, hooks, harpoons, knives or similar tools. In addition, it is prohibited to transport the lobster from the island to any other part of the country, although tourists may take a maximum of two lobsters during the period in which extraction is authorised.

Parribacus perlatus (Fig. 6)

International name: Crayfish, cigalle

Local name: "*Rape rape*" (Rapa Nui name)

Distribution: The species is only known from shallow waters of EI (Holthuis, 1991) and SG.

General species background: Information regarding this species is scarce. It is sporadically caught by diving or by traps set for the Easter Island lobster. Due to its size and the fact that its meat is similar to the lobster, it is sought after for local consumption, though its real potential for exploitation is unknown.

Fishery management: No administrative regulation measures are in place.

Scyllarides rogeenveeni (Fig. 7)

International name: Crayfish, cigalle

Local name: "*Ura rape rape*" (Rapa Nui name)

Distribution: Endemic species found only in shallow waters of EI (Holthuis, 1991) and SG.

General species background: Information regarding this species is scarce. It is sporadically caught by diving or by traps set for the Easter Island lobster. The species is locally consumed due to its size and lobster-like taste; however, its real potential for exploitation is unknown.

Fishery management: No administrative regulation measures are in place.

CONCLUSIONS

On Chilean island territories, three families of stomatopods and 57 of decapods have been recorded, comprising a total of 204 species, where the decapods are more abundant (194 species) (Table 1). The highest number of species was identified on Salas y Gómez Island (52.6%) and on Easter Island (45.6%), whilst the lowest number was recorded on the Desventuradas Islands (3.1%). The low number of species seen on the latter islands is to be expected as they have not been researched in a systematic manner, and they urgently require consideration as a priority for future study.

Through the analysis of similarity dendrograms with the zoogeographical aspects of 431 species of crustaceans, Retamal & Moyano (2010) found that Easter Island has the lowest level of affinity (10%) compared to the other areas, which is attributed to its geographic isolation. Salas y Gómez Island showed higher affinity with species reported from the Nazca Ridge than with those from Easter Island. The Desventuradas Islands and the Juan Fernández Archipelago have a high similarity (>60%) with a scarce relation to continental species (Retamal & Moyano, 2010).

Despite the high number of species recorded, only six are of interest to human consumption (Table 2). Of these, three are exploited by artisanal fishing operations: the Juan Fernández lobster (*Jasus frontalis*), the Easter Island lobster (*Panulirus pascuensis*) and the golden crab (*Chaceon chilensis*). However, only *J. frontalis* represents an established fishing operation with catch volumes of a certain level from the Desventuradas Island and the Juan Fernández Archipelago, constituting the main economic resources of the people that catch and export live crustaceans to the continent and abroad. The other three (*Projasus bahamondei*, *Parribacus perlatus* and *Scyllarides*

Table 1. Geographical distribution of families and species of Stomatopoda and Decapoda registered from Chilean oceanic islands.

Taxonomic classification		Geographical distribution				Total
		Easter Island	Salas y Gómez Island	Desventuradas Islands	Juan Fernández Archipelago	
Stomatopoda	Families	2 (66.6%)	1 (33.3%)	0	1 (33.3%)	3
	Species	3 (60.0%)	1 (20.0%)	0	2 (40.0%)	5
Decapoda	Families	39 (68.4%)	36 (63.1%)	5 (8.8%)	16 (28.0%)	57
	Species	89 (45.9%)	102 (52.6%)	6 (3.1%)	20 (10.3%)	194

Table 2. Chilean oceanic islands decapods of commercial interest. Ex: species currently exploited; FP: species of interest to fishing; PA: present in the area.

Species	Geographical distribution			
	Easter Island	Salas y Gómez Island	Desventuradas Islands	Juan Fernández Archipelago
Jasus frontalis			Ex	Ex
Projasus bahamondei				PA
Panulirus pascuensis	Ex	PA		
Parribacus perlatus	PA	PA		
Scyllarides rogeenveeni	PA	PA		
Chaceon chilensis			Ex	Ex

rogeenveeni) are potential or secondary resources, as they are exploited at low levels or only occasionally, and mainly for local consumption only.

Finally, it should be reiterated that there is a need to promote research to generate precise inventories of the fauna present on the seamount ranges on the southeastern Pacific Ocean and in the waters around Chilean oceanic islands. It is very likely that the real riches of this carcinofauna are currently underestimated. This knowledge is necessary not only for science and for practical purposes, but also for decision-making regarding the conservation and/or management of these species.

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