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# The Chilean Blue Whale (*Balaenoptera musculus chilensis* Khalaf, 2020): A New Subspecies from Chile

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الحوت الأزرق التشيلي (بالنيوترا موسكيولوس تشيلنسيس  
خلف ، 2020) : نُويج جديد من الحيتان الزرقاء من تشيلي

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## Abstract

There are five distinct subspecies of blue whales: the Northern Blue Whale *Balaenoptera musculus musculus* Linnaeus, 1758 of the North Atlantic and North Pacific, the Antarctic Blue Whale *Balaenoptera musculus intermedia* Burmeister, 1871 of the Antarctic Zone and Southern Ocean, the Pygmy Blue Whale *Balaenoptera musculus brevicauda* Ichihara, 1966 found in the Indian Ocean and South Pacific Ocean, the Northern Indian Ocean Blue Whale *Balaenoptera musculus indica* Blyth, 1859, found in the Northern Indian Ocean, and the unnamed Chilean Blue Whale *Balaenoptera musculus un-named subsp.*, found off Chile and the southeastern Pacific Ocean (Khalaf, August 2015, November 2018, October 2021), and which is intermediate in size between pygmy blue whales and Antarctic blue whales. This unnamed subspecies was recognized by the Society for Marine Mammalogy's Taxonomy Committee, taking into account body measurements, geographical, acoustic and genetic evidence that Chilean blue whales are substantially different from Antarctic blue whales and pygmy blue whales. As a result, the unnamed subspecies was scientifically named. It was given the name *Balaenoptera musculus chilensis* Khalaf, 2020.

## مُلخص

هناك خمسة سلالات مُتميزة من الحيتان الزرقاء : الحوت الأزرق الشمالي والذي يعيش في شمال المُحيط الأطلسي وشمال المُحيط الهادي ، وحوت أزرق القطب الجنوبي والذي يعيش في المنطقة القطبية الجنوبية والمُحيط الجنوبي ، والحوت الأزرق القزمي والذي يعيش في المُحيط الهندي وجنوب المُحيط الهادي ، وحوت أزرق شمالي المُحيط الهندي والذي يعيش في شمال المُحيط الهندي ، وحوت أزرق تشيلي والذي يعيش قبالة سواحل تشيلي وجنوب شرق المُحيط الهادي ، والذي لم يتم تسميته علمياً حتى الآن ، وهو

يتوسط حجماً الحوت الأزرق القزمي وحوت أزرق القطب الجنوبي . لقد تم الاعتراف بالسلسلة التشيلية الغير مُسماة من قبل لجنة تصنيف جمعية الثدييات البحرية ، مع الأخذ بعين الاعتبار القياسات الجسمية ، والأدلة الجغرافية والصوتية والجينية ، والتي دلت على أن الحيتان الزرقاء التشيلية تختلف إختلافاً جوهرياً عن حيتان زرقاء القطب الجنوبي والحيتان الزرقاء القزمية . نتيجة لذلك ، فقد تم علمياً تسمية السلسلة الغير مُسماة ؛ وقد أعطي لها إسم (بالنيوترا مُوسكيولوس تشيلينسيس خلف ، 2020 ) .

### Keywords:

Cetacea, Balaenopteridae, Blue whale, *Balaenoptera musculus*, *Balaenoptera musculus chilensis*, Chilean blue whale, New subspecies, Chile, South America, Southeastern Pacific Ocean



18 meter long Chilean Blue Whale skeleton at the Chilean National Museum of Natural History in Santiago, Chile. <https://www.expedia.com/National-Museum-Of-Natural-History-Downtown-Santiago.d6072119.Vacation-Attraction>

### Introduction

The Blue Whale (*Balaenoptera musculus* Linnaeus, 1758) is a marine mammal belonging to the baleen whales (Mysticeti). At 30 metres in length and 170 tonnes (190 short tons) or more in weight, it is the largest existing animal and the heaviest that ever existed (Khalaf, August 2015, November 2018, October 2021).

Long and slender, the blue whale's body can be various shades of bluish-grey dorsally and somewhat lighter underneath. There are five distinct subspecies of blue whales: the Northern Blue Whale *Balaenoptera musculus musculus* Linnaeus, 1758 of the North

Atlantic and North Pacific, the Antarctic Blue Whale *Balaenoptera musculus intermedia* Burmeister, 1871 of the Antarctic Zone and Southern Ocean, the Pygmy Blue Whale *Balaenoptera musculus breviceauda* Ichihara, 1966 found in the Indian Ocean and South Pacific Ocean, the Northern Indian Ocean Blue Whale *Balaenoptera musculus indica* Blyth, 1859, found in the Northern Indian Ocean, and the unnamed Chilean Blue Whale *Balaenoptera musculus un-named subsp.*, found off Chile and the southeastern Pacific Ocean (Khalaf, August 2015, November 2018, October 2021), and which I am naming scientifically in this paper as *Balaenoptera musculus chilensis* Khalaf, 2020 (new subspecies).

## Study

In the Southern Hemisphere, blue whales are divided into three subspecies, Antarctic blue whales (*Balaenoptera musculus intermedia*), pygmy blue whales (*Balaenoptera musculus breviceauda*), and the newly named Chilean blue whale (*Balaenoptera musculus chilensis* Khalaf, 2020) (new subspecies), found off Chile and the southeastern Pacific Ocean and which is intermediate in size between pygmy blue whales and Antarctic blue whales.

The previously unnamed subspecies has been accepted by the Society for Marine Mammalogy's Taxonomy Committee (Committee on Taxonomy, 2016; Vernazzani, Jackson, Cabrera, Carlson & Brownell Jr., 2017), taking into account body measurements, maximum length, mean length at sexual maturity, ratio of length to width of baleen plates, and length of the tail region (Mackintosh & Wheeler, 1929; Ichihara, 1966), geographical, acoustic call types (Stafford, Chapp, Bohnenstiehl & Tolstoy, 2011) and genetic evidence (LeDuc et al., 2007) that Chilean blue whales are substantially different from Antarctic blue whales and pygmy blue whales.

Scientific data (Pastene, Acevedo & Branch, 2019/2020) shows that maximum body length and mean body length of both sexually mature females and males for Chilean blue whales are intermediate between pygmy and Antarctic blue whales; and that fluke-anus lengths of Chilean blue whales differ greatly from pygmy blue whales, but not generally from Antarctic blue whales, and even the snout-eye dimensions vary among all three groups. Such scientific findings further indicate that Chilean blue whales are a distinct group requiring different management from other populations of blue whales, and are also consistent with suggestions (Pastene, Acevedo & Branch, 2019/2020) that Chilean blue whales are not the same subspecies as pygmy blue whales.

The Antarctic and Pygmy blue whales segregate latitudinally during the austral summer, with Antarctic blue whales happening principally south of 52°–54°S and pygmy blue whales toward the north (Branch et al., 2007; Ichihara, 1966). During the austral winter, some Antarctic blue whales stay south of 54°S (Širović, Hildebrand, Wiggins & Thiele, 2009), while most scatter northwards, sometimes almost reaching the Equator, in the western Pacific, eastern Pacific, eastern and central Atlantic (Thomisch,

2017), and in the central and eastern Indian Oceans (Pastene, Acevedo & Branch, 2019/2020).

The structure of population of pygmy blue whales is less evident than that of Antarctic blue whales. Specific song types are correlated with groupings of blue whales occurring in the northern Indian Ocean, the western Indian Ocean, southern and southwestern Australia to Indonesia, the southwestern Pacific including New Zealand, and the southeastern Pacific from the Eastern Tropical Pacific (ETP) to Chile (Branch, Abubaker, Mkango & Butterworth, 2007). The taxonomic status of blue whales from different geographic areas is in flux, with controversy as to whether Northern Indian Ocean blue whales (*B. m. indica*) and Chilean blue whales (*B. m. chilensis*) (new subspecies) can both be regarded as separate subspecies (Branch and Mikhalev, 2008; Pastene, Acevedo & Branch, 2019/2020).

LeDuc et al. (2007) conducted an mtDNA and microsatellite genetic analysis involving blue whales from three geographic areas, the Southeast Pacific Ocean including Chilean waters, the Southwest Indian Ocean (pygmy blue whales) and the Antarctic continent (Antarctic blue whales). Blue whales were strongly distinguished from each of these geographical areas, and the genetic distinction between nominal subspecies (Antarctic and pygmy blue whales) was close to that between Chilean blue whales and pygmy blue whales. More recent genetic work has confirmed that there is a distinction between pygmy, Antarctic and southeastern Pacific blue whales, and genetic differences between southeastern and northeastern Pacific blue whales have also been found (LeDuc et al., 2017). Of main interest is that blue whales in the ETP are genetically similar to Chilean blue whales if they are in the offshore waters of Peru and Ecuador south of the Equator, but genetically similar to northeastern Pacific blue whales if they are in the Costa Rica Dome area north of 6 ° N (LeDuc et al., 2017). No samples were collected between 0 ° and 6 ° N, where despite comprehensive ship-based survey efforts there is still a void in sightings (Branch et al., 2007). Additional genetic studies in Antarctic blue whales have found a high genetic diversity including differentiation among the six IWC areas (Sremba, Hancock-Hanser, Branch, LeDuc, & Baker, 2012); evidence for three genetically distinct but sympatric groupings of Antarctic blue whales (Attard, Beheregaray, & Möller, 2016); that Antarctic blue whales are the founding population of both Australian pygmy and Chilean blue whales (Attard et al., 2015); and that while blue whales in Australia (Attard et al., 2015) and New Zealand (Barlow et al., 2018) have low genetic diversity, Chilean blue whales have high genetic diversity (Pastene, Acevedo & Branch, 2019/2020).

Branch et al. (2007) conducted length frequency study of sexually mature female blue whales from many parts of the Southern Hemisphere. One of their main findings was the mean length of sexually mature Chilean blue whales (23.5 meters) was intermediate between blue whales taken from both the southern and northern Indian Ocean, north of 52 ° S (21.0 meters) and Antarctic blue whales (25.4–26.6 meters) . Their interpretation of this finding was that Chilean whales are a distinct subspecies or distinctive population.

This interpretation has been accepted by the Society for Marine Mammalogy, which now lists three subspecies of blue whales in the Southern Hemisphere: Antarctic blue whale *B. m. intermedia*; pygmy blue whale *B. m. brevicauda*; and Chilean blue whale *B. m. un-named subsp.* (Committee on Taxonomy, 2018). Their classification was based both on Branch et al. (2007), and the molecular data in LeDuc et al. (2007). However, this classification is not consistent with the phylogenetic concept of Evolutionary Significant Units (ESUs) sensu Moritz (1994), since although blue whales from the southwestern Indian Ocean, southeastern Pacific off Chile and Antarctic display significant genetic differentiation, they are not characterized by complete monophyly (LeDuc et al., 2007; Attard et al., 2015; Pastene, Acevedo & Branch, 2019/2020).



Chilean Blue Whale's fluke off Isla de Chiloé, Chile.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0168646>

## Distribution

The Chilean subspecies, *B. m. chilensis* (new subspecies), is found in the southeastern Pacific Ocean, especially the Chiloé-Corcovado region (Chile), and lower latitude areas including Peru, the Galapagos Islands and the southern portions of the Eastern Tropical Pacific (Wikipedia; Khalaf, May 2020).

## Classification

**Kingdom:** Animalia Linnaeus, 1758

**Phylum:** Chordata Haeckel, 1874

**Class:** Mammalia Linnaeus, 1758

**Order:** Artiodactyla Owen, 1848

**Infraorder:** Cetacea Brisson, 1762

**Family:** Balaenopteridae Gray 1864

**Genus:** *Balaenoptera* Lacépède, 1804

**Species:** *Balaenoptera musculus* Linnaeus, 1758

**Subspecies:** *Balaenoptera musculus chilensis* Khalaf, 2020

## Etymology/Derivation of the Scientific Name

The genus name *Balaenoptera* is a combination of two Latin words, *balaena* (meaning whale) and "*pteron*" (meaning fin). It thus means a whale having a dorsal fin so as to distinguish from *balaena* (meaning whale without dorsal fin) (Hidehiro Kato, 1994).

The specific name *musculus* means in Latin "contractible animal tissue consisting of bundles of fibers," "a muscle of the body," from Latin *musculus* "a muscle," literally "a little mouse," diminutive of *mus* "mouse"; so called because the shape and movement of some muscles (notably biceps) were thought to resemble mice. The analogy was made in Greek, too, where *mys* is both "mouse" and "muscle," and its combining form gives the medical prefix myo-. Compare also Old Church Slavonic *mysi* "mouse," *mysica* "arm;" German *Maus* "mouse; muscle," Arabic 'adalah "muscle," 'adal "field mouse;" Cornish *logodenfer* "calf of the leg," literally "mouse of the leg." In Middle English, *lacerte*, from the Latin word for "lizard," also was used as a word for a muscle (Quora.com).

The subspecific name *chilensis* is Latin for Chile, where this subspecies of blue whale is living.

## Conclusion:

**After comparing the five different subspecies of blue whale, it was found that the unnamed Chilean blue whale was a distinct subspecies. It was given the scientific name *Balaenoptera musculus chilensis*, new subspecies. The subspecific name *chilensis* is Latin for Chile, where this subspecies of blue whale is living.**

***Balaenoptera musculus chilensis*, new subspecies:**

**Scientific trinomial name: *Balaenoptera musculus chilensis* Khalaf, 2020.**

**Authority:** Prof. Dr. Sc. Norman Ali Bassam Khalaf-von Jaffa.

**Common Name:** Chilean Blue Whale.

**Holotype:** Chilean Blue Whale skeleton at the Chilean National Museum of Natural History in Santiago, Chile, 18 meters long.

**Location:** Chilean National Museum of Natural History in Santiago, Chile.



18 meter long Chilean Blue Whale skeleton at the Chilean National Museum of Natural History in Santiago, Chile. <https://jetsettingfools.com/wp-content/uploads/2019/04/Inside-National-Museum-Santiago-Chile.jpg#main>



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