

# Skin lesions on blue whales off southern Chile: Possible conservation implications?

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## ABSTRACT

We report on three types of skin lesions in a population of blue whales, *Balaenoptera musculus*, off the northwestern coast of Isla Grande de Chiloe, Chile. These lesions were: (1) cookie-cutter shark, *Isistius brasiliensis*, bites, (2) vesicular or blister lesions, and (3) a tattoo-like skin disease. The presence of these lesions was determined by the examining photos collected in 2006 and 2007 for a blue whale photo-identification project. We examined 289 photographs of 68 individuals for lesions. The cookie-cutter shark lesions are common on these blue whales and similar to those reported from other species of cetaceans. Skin peeling or shedding was observed on some whales and is believed to be a normal condition. Based on the photographs examined to date the vesicular lesions are more common than the tattoo-like lesions. The tattoo-like skin lesions was observed just on a single whale in 2007. The blister lesions were common on whales in both 2006 and 2007. The presence of blister lesions in both years may indicate that this “disease” will be present in the population for a long time. It is unknown if these lesions contribute to mortality of blue whales frequenting Chilean waters, but the tattoo-like skin lesions if shown to be a pox virus could cause neonatal and calf mortality. Additional investigations are needed that, as a minimum, must include the histological and genetic examination of the two types of disease from live or dead whales, especially the tattoo-like skin lesions. Until this work is undertaken, it will be impossible to determine if these lesions pose a conservation risk to the blue whales off Chile.

## INTRODUCTION

Almost 3,000 blue whales, *Balaenoptera musculus*, were killed in the coastal waters of Chile between 1929 and 1971, but very little is known about their biology and ecology. Recently, blue whales have been reported from the waters on the outer coast of Isla Grande de Chiloe (Cabrera, Carlson and Galletti 2005), in the Golfo de Corcovado, and around the Chonos Archipelago, Chile (Hucke-Gaete, Osman, Moreno, Findlay and Ljungblad 2004). These blue whales feed in southern Chilean waters during the austral summer and fall.

Blue whales in Chilean waters have been classified as either Antarctic blue whales, *Balaenoptera musculus intermedia*, or pygmy blue whales, *B. m. brevicauda*. However, Branch, Abubaker, Mkango, Butterworth (In press) have shown, based on the length frequency of adult females, that blue whales captured off Chile are intermediate in total length between the two described Southern Hemisphere subspecies and therefore probably represent a unique population or even a different subspecies. More data are needed to resolve this question.

The purpose of this note is to report on skin lesions observed on blue whales photographed off the northwestern coast of Isla de Chiloe, Chile, in 2006 and 2007. We describe the morphology of these lesions and comment on their possible origin. We also discuss the possible conservation implications that these lesions have for blue whales off Chile.

## MATERIALS AND METHODS

We examined a series of photographs of 68 blue whales taken during the austral summer 2006 and two additional blue whales photographed during February 2007. One of the 2007 whales was a resighting from 2006. These whales were photographed to identify individual whales offshore on the northwestern shore of Isla Grande de Chiloé, Chile. We observed a variety of lesions on these blue whales in the photographs and during our at-sea observations.

Examples of skin lesions described in this paper were sent to various researchers working on blue whales in different parts of the world to see if any of them had observed similar types of lesions on the blue whales they study.

## RESULTS

We examined 289 photographs from 68 individual blue whales collected in 2006. Thirty-seven of these individuals had cookie-cutter shark lesions; 52 had vesicular or blister lesions; 17 had linear marks, including some that may be related to blister lesions or tattoo lesions; and 11 had miscellaneous unknown scars or marks. Ten individuals had peeling skin and three had rake marks from killer whales. The identification photographs of blue whales (approximately 80 individuals) collected in 2007 have not been examined in detail. However, two blue whales photographed in February 2007 are included here. One had extensive tattoo-like lesions over a large portion of its body and the other a open lesion that may have resulted from one of the blister lesions.

### Cookie-cutter shark lesions

Cookie-cutter shark bites were recorded from left side photographs of 69.2% of the individuals (n=18) examined (Figure 1). Most of scars had healed but some whales had open wounds. Healed scars usually do not have pigment and the scar area is white.

### Vesicular or blister lesions

Based on the photographs we examined, 52 individual blue whales had either raised lesions or lesions that had opened and were in various stages of healing (Figure 2) The raised or blister-like lesions were about the same size or slightly larger than a cookie-cutter shark bite but the lesion was rounder in shape than the oval bites caused by cookie-cutter sharks (Figure 1). Only one open, raw lesion was the general size of one of these blister lesions was observed in February 2007 (Figure 3). Another commonly observed scar was a round crater-like depression in the skin that is the same size as a blister lesion and therefore may be a healed blister lesion (Figure 4).

### Tattoo-like skin lesions

We photographed one individual with extensive tattoo-like lesions (Figure 5) on 8 February 2007. This whale was not observed again during the 2007 field season. A few other whales may have had this type of lesions too but the lower quality of the photographs prevented us from making a positive determination.

### Other skin conditions

Eleven blue whales were found with various other markings. Ten whales showed signs of peeling skin and others had rake marks from killer whales. In a few photographs, what appears to be a diatom film was observed on the skin of some whales. In some of the whales we could observe a dark diatom film. The pseudostalked barnacle, *Xenobalanus globicipitis*, was common on the dorsal fin and flukes. One blue whale encountered on 10 March 2006 had many of these barnacles on the trailing edge of its flukes.

## DISCUSSION

### Cookie-cutter shark lesions

Cookie-cutter shark bites probably occur in waters to the north of Chiloe but nothing is known about the distribution of cookie-cutter sharks in Chilean waters or the time required for these wounds to heal.

These scar lesions are commonly reported crater wounds both open and healed on cetaceans (Jones 1971) that are now widely recognized to be caused by the cookie-cutter shark, *Isistius brasiliensis*. We commonly observed this type of scar and wounds on blue whales and also assigned their origin to cookie-cutter sharks.

### Vesicular lesions

Blister lesions have been previously reported from North Atlantic right whales, *Eubalaena glacialis* (Pettis *et al.* 2004). However, nothing is known about the origin of these lesions. Vesicular lesions have been reported in captive bottlenose dolphins, *Tursiops truncatus*, and some individuals had these lesions in association with the characteristic tattoo lesion related to poxvirus (Smith, Skilling and Ridgway 1983). These authors identified the source of the vesicular lesions as a calicivirus and its serotype was designated cetacean calicivirus Tursiops-1. Our one blue whale with the tattoo-like lesions also had at least one vesicular lesion in the middle of the tattoo lesions.

Caliciviruses have been reported from ocean sources for over 65 years (Smith, Skilling, Cherry, Mead, and Matson 1998). Caliciviruses were believed to be host-specific but the idea was challenged in 1972 when one of these viruses from a sea lion was infectious for swine (Smith, *et al.* 1973) and later a probable interspecies transmission from a bottlenose dolphin to a California sea lion was shown (Smith *et al.* 1983).

### Tattoo-like skin disease

Poxvirus infections in cetaceans are usually characterized by irregular, slightly raised skin lesions that are grey, black or yellowish and can occur on any part of the body in various species of small cetaceans (Van Bresseem and Van Waerebeek 1996). These lesions are known as tattoos (Geraci and St. Aubin 1979, Flom and Houk 1979). These lesions are known from both wild and captive small cetaceans. The most extensive study of poxvirus in the wild is on dusky dolphins, *Lagenorhynchus obscurus*, and Burmeister's porpoise, *Phocoena spinnipinnis*, from the coastal waters of Peru (Van Bresseem *et al.* 1993). Near our study area, in southern Chilean fjords, Viddi *et al.* (2005) reported that two other small cetaceans, bottlenose dolphins and Chilean dolphins, *Cephalorhynchus eutropia*, had remains of tattoos and tattoo-like lesions and suggested these lesions may be related to a degrading environment. Van Bresseem *et al.* (2003) suggested that tattoo disease in small cetaceans is a potential indicator of a degraded or stressful environment.

The first report of a poxvirus from a baleen whale was a genetic identification in tissue from a lesion collected from a bowhead whale in Alaska (Brancht *et al.* 2006). However, these authors did not illustrate the original lesion from that whale.

### Other skin conditions

Skin peeling or shedding is common in bowheads (Brownell, unpublished data), right whales (Pettis *et al.* 2004), gray whales [SMM 2006] and blue whales in the western North Atlantic from the Gulf of St. Lawrence (Sears *et al.* 2000). This is a normal condition that may be seasonal and or related to a change in the salinity of the water. Broad parallel tooth scars from killer whales are also commonly observed on other species of baleen whales.

The pseudostalked barnacle, *Xenobalanus globicipitis*, is known from numerous species of both large and small cetaceans in all tropical, warm-temperate and cold-temperate waters (Rajaguru and Shantha 1992).

### Possible conservation implications

If the tattoo-like skin disease we found on blue whales is a cetacean poxvirus, it could have conservation implications. It has been hypothesized that in small cetaceans this infection may kill neonates that do not have protective immunity (Van Bressem, Van Waerebeek and Raga 1999). Resident bottlenose dolphins with tattoo skin disease were studied in the Sado Estuary, Portugal and the disease prevalence was significantly higher in immatures than in adults (Van Bressem, Gaspar and Aznar 2003). These authors also reported that the dolphin population in this area is declining.

### Recommendations

We recommend that close-ups photographs of any skin lesions (with samples for serology, genetics, and pathology) be collected from any dead blue whale to attempt to detect any viral diseases. Also biopsies from live blue whales with vesicular and tattoo-like lesions need to be sampled to learn more about these diseases.

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Figure 1. Cookie-cutter shark, *Isistius brasiliensis*, bites/scars in white (100306\_0060\_099) on the lateral side of a blue whale, *Balaenoptera musculus*, off Isla Grande de Chiloe, Chile.



Figure 2. Blister or vesicular lesions (160206\_0236\_07L) on the dorsal-lateral surface on a blue whale, *Balaenoptera musculus*, off Isla Grande de Chiloe, Chile.



Figure 3. Possible open blister or vesicular lesion (160207\_089\_040L) on the dorsal-lateral surface on a blue whale, *Balaenoptera musculus*, off Isla Grande de Chiloe, Chile.



Figure 4. Possible healed blister lesions (160206\_0122\_027R) on the dorsal-lateral surface on a blue whale, *Balaenoptera musculus*, off Isla Grande de Chiloe, Chile.



Figure 5. Tattoo-like lesions (080207\_024\_001L) on a blue whale, *Balaenoptera musculus*, off Isla Grande de Chiloe, Chile. Almost the entire posterior region of the exposed body is covered with scars.