

Summary of photo-id information of blue whales collected by JARPA/JARPA II and preliminary analysis of matches in the feeding grounds

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ABSTRACT

This paper summarizes the information on photo-identification of blue whales obtained by JARPA/JARPA II surveys in Antarctic Areas IIIE, IV, V and VIW during the austral summer seasons from 1992/93 to 2008/09. There are a total of 476 pictures of blue whales in the photo-id catalogue held by the Institute of Cetacean Research, which were selected from the total obtained. All of the pictures were digitized to facilitate archiving. A preliminary matching exercise within the feeding ground resulted in a single match. Within the 2005/06 season a whale first sighted in Area III at position 65°49S, 63°00E on 12 Jan. 2006 was re-sighted in Area IV at position 65°44S, 76°31E on 1st Feb. 2006. The distance between the first and second sightings was 334n.miles and the average distance per day was 17n.miles. Analyses of photographs collected during the JARPA/JARPA II have the potential to contribute to a better understanding of the pattern of movement and residence of blue whales in the feeding grounds. This information can be optimized if these photographs are examined in conjunction with photographs from other surveys and regions. Pictures of blue whales from JARPA/JARPA II will be provided to the IWC catalogue under conditions specified in this paper.

INTRODUCTION

The IWC Scientific Committee (IWC SC) has been conducting an in-depth assessment of Southern Hemisphere blue whales (*Balaenoptera musculus*) since 2006. For this assessment individual identification of whales through photographs of natural marks (photo-id) has been considered an important tool for studying aspects of distribution, movement and abundance of whales. During the 2008 IWC SC meeting Olson (2008) summarized the photo-id photographs obtained during 19 IDCR/SOWER surveys in the Antarctic management Areas I-VI. A total of 21,000 photographs were collected in those surveys representing a minimum of 311 individual blue whales. During the discussion of this paper the SC recommended that blue whale photographs collected during JARPA surveys be examined and integrated into the IWC catalogue, once such examination has been completed by Japanese scientists (IWC, 2009).

During the JARPA and JARPA II surveys in Areas IIIE, IV, V and VIW, photo-id experiments on blue, humpback and right whales have been conducted on an opportunistic basis. A summary of the photographs obtained between the austral summer seasons 1989/90-2004/05 was provided during the JARPA review meeting carried out by the IWC SC in 2006 (IWC, 2008). Photographs of the humpback whales taken during JARPA surveys were submitted to the IWC Antarctic Catalogue administrated by the College of the Atlantic. Those photographs were compared with

photographs from other regions of the Southern Hemisphere. Several matches were found between whales in Eastern Australia and Antarctic Area V (Rock *et al.*, 2006). Photographs of the southern right whales taken during JARPA surveys were compared with others obtained in Australian waters and a match was reported between a whale in Adelaide and Antarctic Area IV (Bannister *et al.*, 1999).

The objective of this paper is to summarize the photographs of blue whales taken during the JARPA and JARPA II surveys in Antarctic Areas IIIE, IV, V and VIW following a recommendation from the IWC SC in 2008. Results of a preliminary analysis showing a match of an individual whale within the Antarctic feeding grounds is also presented.

COLLECTION OF PHOTOGRAPHS

Pictures of natural marks of blue whales were taken during the systematic line transect sighting survey for abundance estimation and random sampling of Antarctic minke whales under the JARPA/JARPA II. Details of the survey procedure for JARPA surveys from the 1987/88 to the 2004/05 austral summer seasons can be found in Nishiwaki *et al.* (2006). On an opportunistic basis the dedicated sighting vessel (SV) and the sighting and sampling vessels (SSV) approached blue whales for conducting experiments on photo ID. When possible the same whale was also sampled for skin biopsy. Researchers onboard the vessels focused on natural marks of the animals such as scars, dorsal fin with particular shape and the mottled pigmentation pattern of the whale.

Surveys were conducted in IWC Management Areas IIIE, IV, V and VIW during the austral summer seasons (December-March). From the 1992/93 to the 2004/05 seasons photos were taken using 35mm SLR databack cameras equipped with 70-up to 300mm lenses and motor drive. Black and white 400 ASA film (*Ilford* HP5) was used. From the 2005/06 season a digital Nikon 70D cameras equipped with 100-300mm lens was used. To facilitate archiving, pictures taken from 1992/93 to 2004/05 were digitized.

After each summer season the best pictures were selected (LAP for the pictures taken between 1992/93 and 2004/05 and KM for the pictures taken from 2005/06) and these pictures were entered into the Institute of Cetacean Research (ICR) catalogue. The selected pictures are summarized in this paper.

RESULTS AND DISCUSSION

Table 1 summarizes the results of the photo-ID experiments in JARPA and JARPA II. A total of 476 photographs were selected from those taken during the 1992/93 to 2008/09 seasons (17 seasons). The numbers of photographs by IWC Management Area are 154, 154, 118 and 50 in Areas IIIE, IV, V and VIW, respectively. The JARPA set involves a maximum of 68 individuals and biopsy samples were obtained from 13 of those individuals.

Natural marks in the ICR photo-id catalogue include mottled pigmentation of the body, shape of the dorsal fin plus mottled pigmentation and shape of dorsal fin. The proportions of these marks in the JARPA set are 86%, 11% and 3%, respectively. Currently the photographs of the mottled pigmentation of the body are being grouped according the characterization of Sears *et al.* (1990).

A very preliminary matching exercise resulted in a single match (Table 2, Figures 1 and 2). Within the 2005/06 season a whale was first sighted in Area III at position 65°49S, 63°00E on 12 Jan. 2006. The estimated body length of the whale was 26.8m. The same whale was sighted in Area IV at position 65°44S, 76°31E on 1st Feb. 2006. Researchers estimated the body size in 26.1m and got a biopsy sample so the sex of the animal can be determined in the near future using molecular techniques. The distance between the first and second sightings was 334n.miles. The time between sightings was 20 days and the average distance per day was 17n.miles (Figure 3).

Analyses of photographs collected during the JARPA/JARPA II have the potential to contribute to a better understanding of the pattern of movement and residence of blue whales in the feeding grounds. This information can be optimized if these photographs are examined in conjunction with photographs from other surveys (e.g. IDCR/SOWER) and regions.

Availability of blue whale photographs from JARPA and JARPA II

In response to the request from the IWC SC (IWC, 2009), digital versions of the photographs of blue whales taken by JARPA and JARPA II in Areas IIIIE, IV, V and VIW will be submitted to the IWC catalogue under the following conditions:

- a) Photographs summarized in Table 1 will be submitted to the IWC Secretariat only with the ID number used in the ICR catalogue and information of the contact person (KM). If a match with photographs from other sources in the IWC catalogue is made, colleagues should contact KM to negotiate the terms of any research and paper emerging from the match following IWC SC data access Procedure B; see ICR protocol for data request on the following web site:
http://www.iwcoffice.org/_documents/sci_com/DataAvailability/DAProtocolJapan.pdf
- b) Upon agreement, detailed information on location, date of the sighting and other ancillary information will be provided.
- c) Japanese scientists have started analyzing for matches within the feeding grounds using the JARPA and JARPA II photographs, and this effort will continue in the following years. Japanese scientists reserve the right to lead any research and paper emerging from matches in the feeding ground involving exclusively JARPA and JARPA II photographs.

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Table 1. Number of blue whale photographs taken during JARPA and JARPA II surveys by IWC Management Areas and austral summer season.

Survey	Season	IWC Areas				Number of photographs
		III E	IV	V	VI W	
JARPA	1992/93	0	0	33	0	33
	1993/94	0	9	0	0	9
	1994/95	0	0	16	0	16
	1995/96	7	3	0	0	10
	1996/97	0	0	6	2	8
	1997/98	1	4	0	0	5
	1998/99	0	0	21	0	21
	1999/00	22	6	0	0	28
	2000/01	0	0	0	0	0
	2001/02	0	5	0	0	5
	2002/03	0	0	0	6	6
	2003/04	5	4	0	0	9
2004/05	0	0	0	3	3	
JARPA II	2005/06	59	113	0	0	172
	2006/07	0	0	18	0	18
	2007/08	60	10	0	0	70
	2008/09	0	0	24	39	63
	Total	154	154	118	50	476

Table 2. Match of a blue whale in the 2005/06 season, as revealed by photo-identification.

Whale-ID	IWC Area	Date	school size	Latitude	Longitude	Time between sightings (days)	Distance between sightings (n.miles)	Average minimum distance (n.miles/day)
BI069	III	20060112	2	65°49S	63°00E	20	334	17
	IV	20060201	2	65°44S	76°31E			



Figure 1. Whale B1069 sighted in Area III on 12 January 2006. The whale was identified by the particular shape of the dorsal fin.



Figure 2. Whale B1069 sighted in Area IV on 1 February 2006. The whale was identified by the particular shape of the dorsal fin.

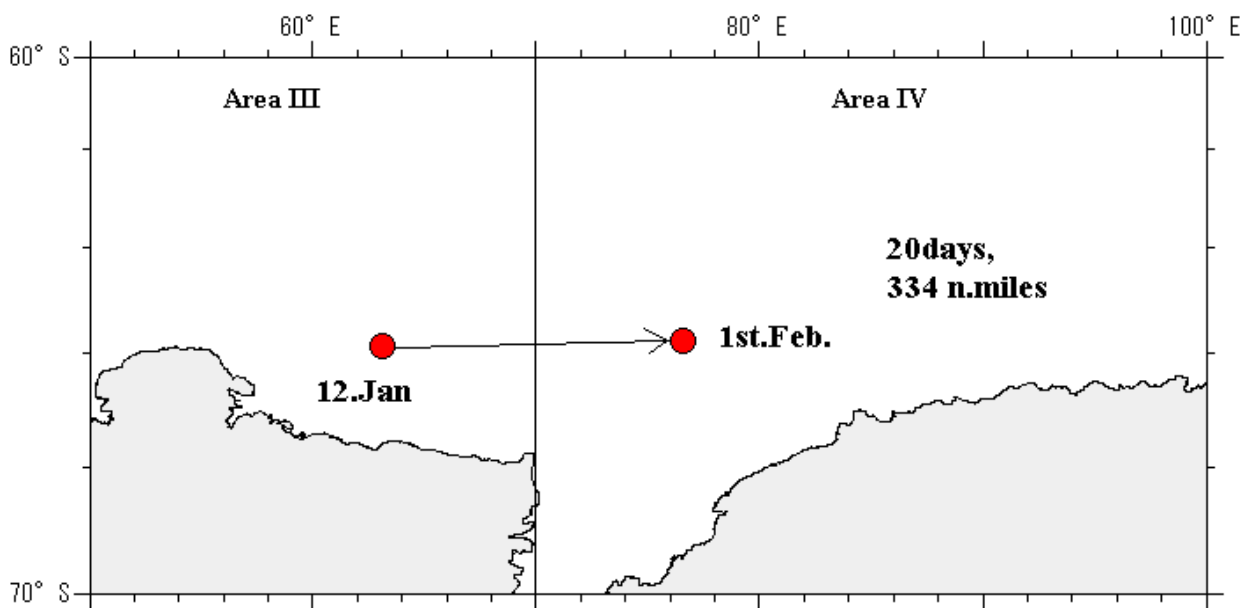


Figure 3. The movement of a re-sighted blue whale between Area III and Area IV in the austral summer season 2005/2006.