Progress Report on the Killing Method of Whales in the JARPN II coastal operation.

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The Second phase of the Japanese Whale Research Programs in the Northwestern Pacific Ocean (JARPNII) has been conducted since the 2000 season. This program includes new research target species of Bryde's whales, Sperm whales and sei whales (since 2002) adding to common minke whales. Since 2002 season, coastal operation of the JARPNII started and four Japanese coastal small type catcher boats took part in minke whaling for the first time in 16 years. Although they have experienced commercial hunting of Baird's beaked whales *Berardius bairdii* and some pilot whales, it became necessary to research and improve killing method of minke whales in coastal operation.

DATA COLLECTION, ANALYSIS and TRAINING of GUNNERS

The method of data collection and analysis in the coastal operation followed those for offshore operation* as same as possible. A researcher on board collected the catch record including TTD for all whales taken. Necropsy of whale carcass was conducted by a researcher besides the biological research at the land base of the coastal operation. All data was accumulated and analyzed so as to improve killing method of whales. Gunners and crews of sampling vessels were briefed at a pre-cruise meeting on the analysis of the past research for the killing methods and were encouraged to achieve the shorter TTD and higher IDR.

* see "*Progress Report on the Killing Method of Whales in the Second Phase of Japanese Whale Research Program in the Antarctic Sea (JARPAII) and Northwestern Pacific Ocean (JARPNII)*".

IMPROVEMENT OF GRENADES FOR COASTAL WHALING VESSELS

At the beginning, the Japanese coastal catcher boats equipped 50 mm whaling cannon and small sized grenades (7g penthrite). However, analysis of data of the first two seasons revealed that the small penthrite grenades were insufficient to kill minke whales even if their body size was relatively smaller than offshore whales. Improvement of the grenade for small type whaling catcher boats was conducted from 2004 to 2006. Newly developed grenades consist of 27g penthrite with refined fuse and short type steel head similar to the figure deployed for large sized grenades*.

Results of the JARPN II (coastal operation)

The JARPNII coastal operations were conducted in Sanriku region (Miyagi pref.) in spring and Kushiro region (Hokkaido) in summer since 2002 season. Sample size of common minke whales was 50 in the first two years and 120 (total of two regional surveys) from 2004 season. Table 1 shows the TTD and the IDR information for common minke whales from the 2002 to 2009 seasons. Regression analysis revealed significant decrease of the TTD ($p<0.0001$) and increase of the IDR ($p=0.001$) during research years (Fig. 1).

Table1. TTD and IDR for common minke whales taken in the JARPNII coastal operation. Yearly total number from 2004 to 2008 season was combined with two surveys (in Sanriku and Kushiro region).

Season	Species	Total number	Time to death (TTD)			Instant death rate (IDR)
			MED	MEAN	S.D.	
2002	Common minke whale (coastal)	50	8:50	8:17	6:07	14.0 %
2003		50	7:40	7:51	2:36	14.0 %
2004		60	5:50	6:51	6:50	30.5 %
2005		120	5:20	6:13	7:16	32.5%
2006		95	3:10	6:42	14:23	43.2%
2007		106	1:45	4:42	6:52	47.2%
2008		110	2:15	4:57	7:23	40.9 %
2009*		60	0:00	2:54	4:02	55.0 %

*Data of 2009 Kusiro region (59 sample) is not analyzed.

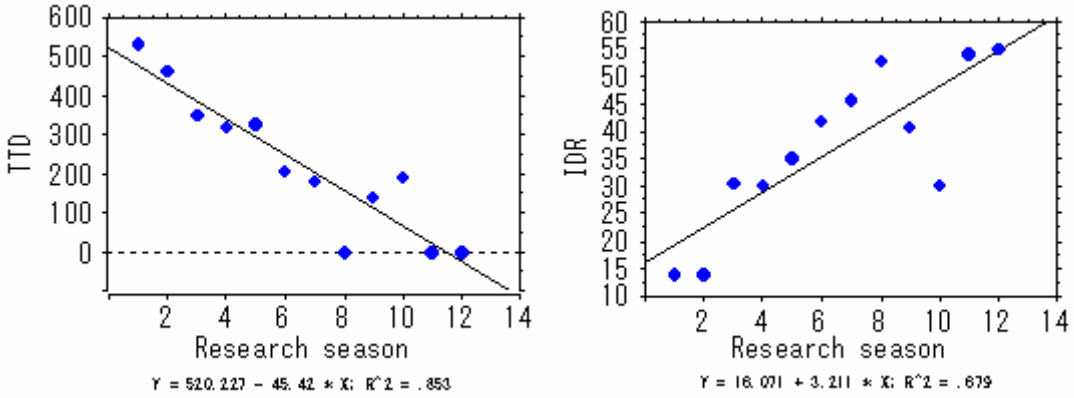

Fig.1. TTD (left) and IDR (right) for common minke whales in each survey of JARPN II coastal operation. TTD is indicated by a median value (seconds) and IDR is indicated by a percentage.