

A NEW TAGGING METHOD OF DOLPHINS

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ABSTRACT

In order to establish a technique to tag the dolphins without disturbing or destroying the school, tagging with bow and arrow was tried for dolphins which come to the bow of the ship. This method requires less skill in shooting and no special handling of the ship. Though, in this method, more than half of the tags are wasted and the length of the time when the tag remains on the dolphin is unknown, this method can be applied in the study of the short period movement of the schools.

INTRODUCTION

Dolphin fishing is operated at the several places on the Pacific coast of Japan. In the northern area *Phocoenoides* and few other boreal species are caught with hand harpoons. And in other area *Stenella caeruleoalba*, *S. attenuata*, and other several delphind species are caught both with hand harpoons and by driving a whole dolphin school into a harbor.

The establishment of the tagging technique is desired to obtain the informations on the migration and the schooling behavior of these species. Especially for the latter purpose, tagging must be performed without destroying the school.

This experiment was intended to establish the method of tagging the dolphins from a cruising vessel.

MATERIALS AND METHOD

The tags are of a type FH-69A (Floy Tag & Manufacturing, Inc., Seattle, Washington), and of the similar type used by Sergeant and Brodie (1969) for *Delphinapterus leucas*, except for a clear vinyl tube which covers, in the present tags, the printed return address and the number. The size of the stainless steel head is 35 mm in length and 7 mm in width. The length of nylon string is 15 cm. The weight of tag is about 3 g.

The arrow, applicator of the tag, is composed of three parts. The shaft is a tube made of glass fiber, 36 cm in length and 7.4 mm in diameter, and furnished with no feather. The head is made of brass. Its anterior part is shaped of a flat disc (15 mm in diameter, and 4 mm in thickness) to protect the dolphin from heavy injury, and the posterior part is shaped of a rod (6 mm in diameter and 17 mm in length) which is inserted into the shaft. A steel rod (70 mm in length and 3 mm in diameter) is inserted into a hole at the center of the brass disc. This rod protrudes about 45 mm from the disc, to leave about 1.5 cm between the disc and head of the tag.

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At the tip of this steel rod, there is a small notch to set the metal head of the tag. The weight of arrow head is about 13 g, and that of the shaft 8 g.

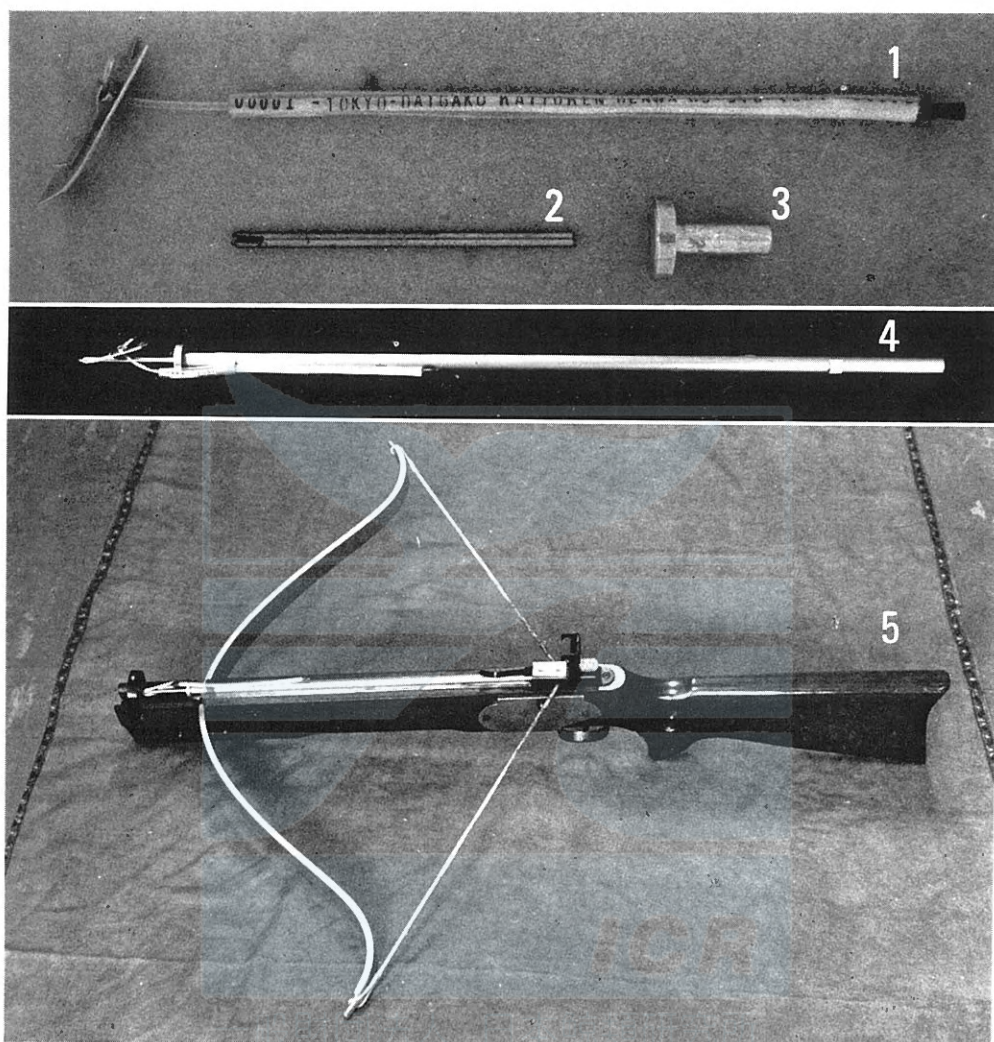


Fig. 1. Tag and tagging instruments. 1 : Tag, 2 : Steel rod of the head of arrow, 3 : Brass disc of the head of arrow, 4 : Tag mounted on the arrow, a small square protuberance is to fix the arrow on the spring of bow. 5 : Cross bow charged with arrow and tag.

In case of shooting the tag, the three parts of the arrow are inserted each other. And the tag head is set in a notch of steel rod and the plastic part is fixed on the shaft with a piece of medical paper adhesive tape. The arrow with tag is shot at the bow of the ship with a crossbow of 80 pound (36 kg) power.

RESULT

Preliminary experiment

As the first step of preliminary experiment, three diameters of disc of the arrow head, 15 mm, 20 mm, and 25 mm, were tried on a carcass of *Stenella caeruleoalba* laid in the air. The 15 mm disc was considered to be of enough size to protect the dolphin, and other experiments were made with 15 mm disc. This tag could efficiently penetrate into the dead dolphin sunk in a tank about 15 cm beneath the surface of the water, when shot at the distance of 5 m and at the angle of about 45°.

Other preliminary experiments were made on a school of *Stenella caeruleoalba* kept alive in Kawana harbor, and on an alive *Phocoenoides truei* tied to a ship. In the former case, two dolphins which had been swimming together were tagged and this accompaniment was observed for 7 hours until one tag, which hit on the hard tissue just behind the blowhole and did not penetrate enough, dropped. Another individual was tagged on the throat and penetrated sufficient depth.

In the case of *Phocoenoides*, when the three parts of the arrow were not fixed but loosely inserted each other, the tag penetrated under the blubber of dorsal region.

Practical experiment

The result of tagging is shown in Table 3. Two tags, nos. 3 and 4, were shot at the bow of the research vessel Tanseimaru (257 gross ton). Her height at bow and speed at the time of tagging were 4.5 m and 10 knot respectively. 8 tags, from no. 31 to no. 45, were shot on the whale catcher Ryuhomaru no. 3 (429 gross ton), and the height and speed were about 6 m and 4 knot respectively. 3 tags, nos. 54, 62 and 67, were shot on the research vessel Hayachinamaru (54 gross ton), and the height and speed were 3 m and 8 knot respectively.

TABLE 1. SOME INFORMATIONS ON TAGGED DOLPHINS

Tag no.	Date	Position	Species	School size	Water temperature	Remarks
3	20 Nov. '71	35°23'N, 141°11'E	<i>Tursiops</i> sp.	13	17.5	Other schools in short distance
4	21 Nov. '71	34°52'N, 141°05'E	<i>S. caeruleoalba</i>	2	20.0	"
31	19 Jan. '72	29°35'N, 140°38'E	"	100	19.8	School of small dolphins, no mother and calf
34	"	"	"			
35	"	"	"	20	19.8	Mother and calf observed
40	"	29°31'N, 140°42'E	"			
41	"	20°07'N, 141°11'E	"	100	21.4	Mother and calf observed
42	"	"	"			
43	"	"	"			
45	"	"	"			
62	10 Feb. '72	39°45'N, 142°17'E	<i>Phocoenoides truei</i>	13	9.4	
67	"	"	"			
54	14 Mar. '72	39°01'N, 142°17'E	"	6	6.3	

21 tags were wasted to tag the 13 dolphins. The number of tags hit is 38% of the total number of tags shot.

At present (31 March 1972) no recovery is reported.

DISCUSSION

This method of tagging is applicable for the dolphins which come to the bow of the ship without any special technics both in shooting the arrow and in handling the ship, even on the ship with high bow. But it is difficult to tag the dolphins which do not come to the bow, and requires special technics in the shooting and in handling the ship.

Even in the former species, the difficulty differs between species. *Phocoenoides* swims zigzag very actively at the bow, and considered to be one of the difficult species to tag.

According to the experiment on the Ryuhomaru no. 3, tagging was easier at the speed of 4 knot than the cruising speed 14 knot, because the dolphin stays longer on the surface, But the suitable speed may vary between species, because too slow speed does not usually attract the dolphin.

The two types of arrow head were tried. In one type, the three parts of the arrow were not fixed but loosely inserted into the holes each other. This type was tried on *Phocoenoides*. In other type the three parts were fixed each other, and tried on other species. There is no difference between two types in the shooting. The tagged dolphins went out of sight, in both cases, with the arrow shaft on its body. But we suppose that the shaft will have dropped within short period. Probably, the former type will be better to expect earlier drop of the shaft.

The efficiency of the similar tag on *Delphinapterus leucas* was reported by Sergeant and Brodie (1969). And it is reported that similar tag had stayed on some delphinids for several months (Evans *et al* 1972).

We consider that the present tagging method will be applicable in the study of short period movement of the dolphins.

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