

CATCH OF THE CUVIER'S BEAKED WHALES OFF JAPAN IN RECENT YEARS

MASAHARU NISHIWAKI* AND NOBUO OGURO*

ABSTRACT

We analysed Cuvier's beaked whales (*Ziphius cavirostris*) caught off the coast of Japan between 1965-70. In most cases they were caught in waters deeper than 1000 m. They eat food abounding in the surrounding waters. 70% of 189 whales were males. This tendency was the same every year, and was also reported by Omura *et al.* (1955). 87% of the whales caught were mature, and the average body length of both sexes was larger than between 1948-52. If an annual quota of 30-50 animals were to be observed, this probably would not endanger the *Ziphius* stock in the western North Pacific.

The 'smaller whale' whaling industry of Japan has been catching a considerable number of Cuvier's beaked whales (*Ziphius cavirostris*) along with Minke whales (*Balaenoptera acutorostrata*) and Baird's beaked whales (*Berardius bairdi*). Omura *et al.* (1955) reported on the Cuvier's beaked whale caught off the coast of Japan between 1948-52. The total catch during that period was 85. *Ziphius* is the least valuable of the three to the whaling industry, and hence there is less pressure on it than on the other two. It is evident that coastal whaling operations have diminished and the number of catcher boats have decreased in recent years. There must, therefore, have been some change in the different relative rates of catch of *Ziphius* and the other two species, while the total catch has been decreasing. Our discussion here concerns *Ziphius* caught between 1965-70. The data was extracted from the report by the Fisheries Agency of the Japanese Government on the harvest of the smaller whales during 1965-70.

ANALYSIS OF CATCH

The areas of the whaling operation and the precise positions of catch are shown in Fig. 1. The coastal waters are divided in the same way as by Omura *et al.* (1955). *Ziphius* whales has been taken in each of the seven areas except for VI, in which, nevertheless, Omura *et al.* has some catch records. The catch positions are mostly on the 1000 m contour or in deeper waters, and are most abundant in areas I and II. The catches are particularly numerous in Area I on account of the indented coastline and the concomitant meandering 1000 m contour.

Table 1 and Fig. 2 show the size distribution of the whales caught. Table 2 indicates the monthly catch in each area. The total catch was 189, of which 132 were males (70%) and 57 were females (30%). This rate is almost the same as re-

* Ocean Research Institute, University of Tokyo, Tokyo.

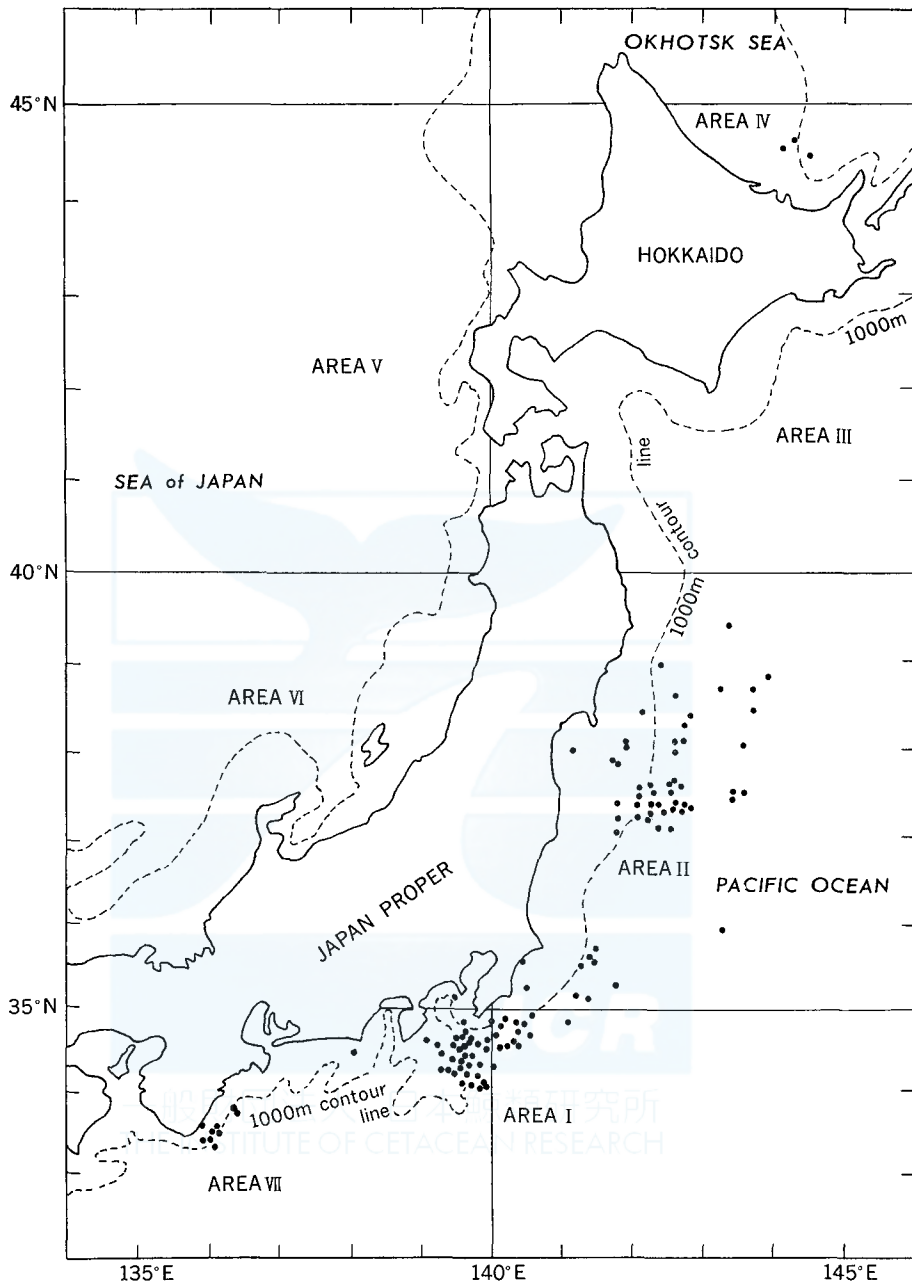


Fig. 1. Position of catch of *Ziphius cavirostris* off Japan, 1965-1970.

TABLE 1. NUMBER OF CATCH OF *ZIPHIUS AVIROSTRIS* ACCORDING TO THE MONTHS AND AREAS, 1965-1970.

Month	Area I		Area II		Area IV		Area VII		Total	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Jan.	2	0	2	2			1	0	5	2
Feb.	18	10							18	10
Mar.	11	8					2	0	13	8
Apr.	1	0							1	0
May	6	2	1	0			3	0	10	2
June	4	2					3	0	7	2
July			1	0	1	0		*	2	0
Aug.	10	3	3	4	2	0		*	15	7
Sept.	7	6	12	1					19	7
Oct.	4	6	8	2					12	8
Nov.	2	3	20	3					22	6
Dec.	0	1	7	4			1	0	8	5
Total	65	41	54	16	3	0	10	0	132	57

* A sex unidentified individual is excluded.

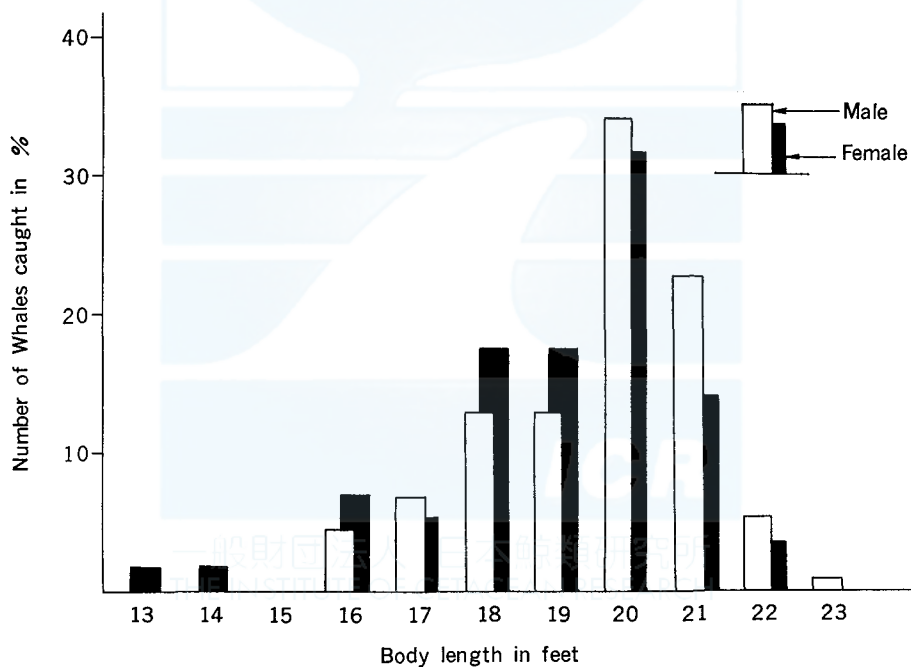


Fig. 2. Size distribution of *Ziphius cavirostris* caught, 1965-1970.

ported by Omura *et al.* The catch in each area was as follows: in area I 106 were caught, 70 in II, 3 in III and 12 (including 2 individuals of unidentified sex) in VII. In Area I, 64 were caught between Jan-June and 42 between Aug-Dec, while area II, 64 of the year's total of 70 were caught between Aug-Dec. In area IV only 3 were caught between May-June, while in area VII records are scattered throughout the

TABLE 2. AVERAGE BODY LENGTH AND SEX RATIO OF *ZIPHIUS CAVIROSTRIS* CAUGHT DIVIDED BY AREAS AND MONTHS, 1965-1970.

	Area I		Area II	
	Male	Female	Male	Female
Jan.-June				
Average length	20.1	19.8	—	—
Sex ratio	65.5	34.4	—	—
Aug.-Dec.				
Average length	18.9	18.1	19.5	19.1
Sex ratio	54.8	45.2	74.1	21.9

first six months of the year.

The whales caught in the above mentioned periods are presented in Table 2 together with the average body length of both sexes and the sex ratio. According to above mentioned data, the abundant catch in Area I between Feb-May may consist of adult males going north to chase after adult females. The whales caught in Area I in the other months may be younger males searching for food. The abundant catch in Area II between Aug-Dec seems to consist of males migrating south, some of them possibly in the company of adult females.

SIZE DISTRIBUTION

As seen in Fig. 2 and Table 3, the greatest body lengths of all the individuals caught were 23 feet for males and 22 feet for females. The most common body length for both sexes was 20 feet, while most of the catch was in the length range 18-21 feet.

There are four species of *Mesoplodon* in the western North Pacific: *M. stejnegeri*, *M. densirostris*, *M. ginkgodens* and *M. carlhubbsi*. We found some suggestions of

TABLE 3. SIZE DISTRIBUTION OF *ZIPHIUS CAVIROSTRIS* CAUGHT, 1965-1970.

Body length in feet	Number			Percentage		
	Male	Number	Total	Male	Female	Total
13		1	1		1.8	0.5
14		1	1		1.8	0.5
15						
16	6	4	*10	4.5	7.0	5.3
17	9	3	12	6.8	5.3	6.4
18	17	10	27	12.9	17.5	14.3
19	17	10	27	12.9	17.5	14.3
20	45	18	*63	34.1	31.6	33.3
21	30	8	38	22.7	14.0	20.1
22	7	2	9	5.3	3.5	4.8
23	1		1	0.8		0.5
Total	132	57	189	100.0	100.0	100.0
Sex ratio	69.8	30.2	100.0			
Maturity				88.6	84.2	87.3

* A sex unidentified individual is excluded.

TABLE 4. ANNUAL CATCH OF *ZIPHIUS CAVIROSTRIS* AND THEIR SEX RATIO ACCORDING TO AREAS, 1965-1970.

Year	Area I		Area II		Area IV		Area VII		Total		Sex ratio	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1965	14	7	28	6	3	0	2	*0	47	13	78.3	21.7
1966	10	8	6	2			1	0	17	10	63.0	37.0
1967	19	12	7	4			3	0	29	16	64.4	35.6
1968	9	6	10	2			2	0	21	8	72.4	27.6
1969	4	2	3	2			2	0	9	4	69.2	30.8
1970	9	6							9	6	60.0	40.0
Total	65	41	54	16	3	0	10	0	132	57	69.8	30.2

* Two sex unidentified individuals are excluded.

Mesoplodon in the discarded bones around the whaling stations where *Ziphius* are processed, but there has been no report of *Mesoplodon* being caught by these companies. Therefore, the data in Fig. 2 for *Ziphius* may include some *Mesoplodon*, but the percentage of the latter is so small that it could exert no significant effect on the figures.

The catch for each year is indicated in Table 4. Although the total catch of *Ziphius* has been decreasing year by year, this may be partly due to reduced hunting effort rather than to an actual population decrease.

FOOD

The stomach contents varied according to the area in which the animals were caught, as shown in Fig. 3. The food found in the stomachs of the animals from Area I consisted mainly of deep-sea fish, but that from animals in Areas II and VII was exclusively squid. There was no food report from Area V. Therefore, deep-sea fish must have been the main food in waters deeper than 1000 m, while squid must be the main food in the shallower waters. As seen in Fig. 3, deep-sea fish were often found in the animals from Area I all through the year, but squid was sometimes found in Area II from Nov-Jan. This evidence suggests that the whales may eat whatever fish are abundant in the waters where they happen to be.

CONCLUSION

Our analysis suggests that Cuvier's beaked whale (*Ziphius cavirostris*) has been being caught throughout the year, abundant harvests being taken in Feb., Sept. and Nov. The greatest body length in our sample is 23 feet (male) and 22 feet (female). The data also suggest that the majority of *Ziphius* whale were caught in waters deeper than 1000 m. The variety of food in the stomachs examined shows that the *Ziphius* whales, like other smaller whales, eats the food most common in its surrounding waters. Both sexes of *Ziphius* seem to be about 18 feet in body length when they attain sexual maturity. 87% of the whales caught were mature, and the average

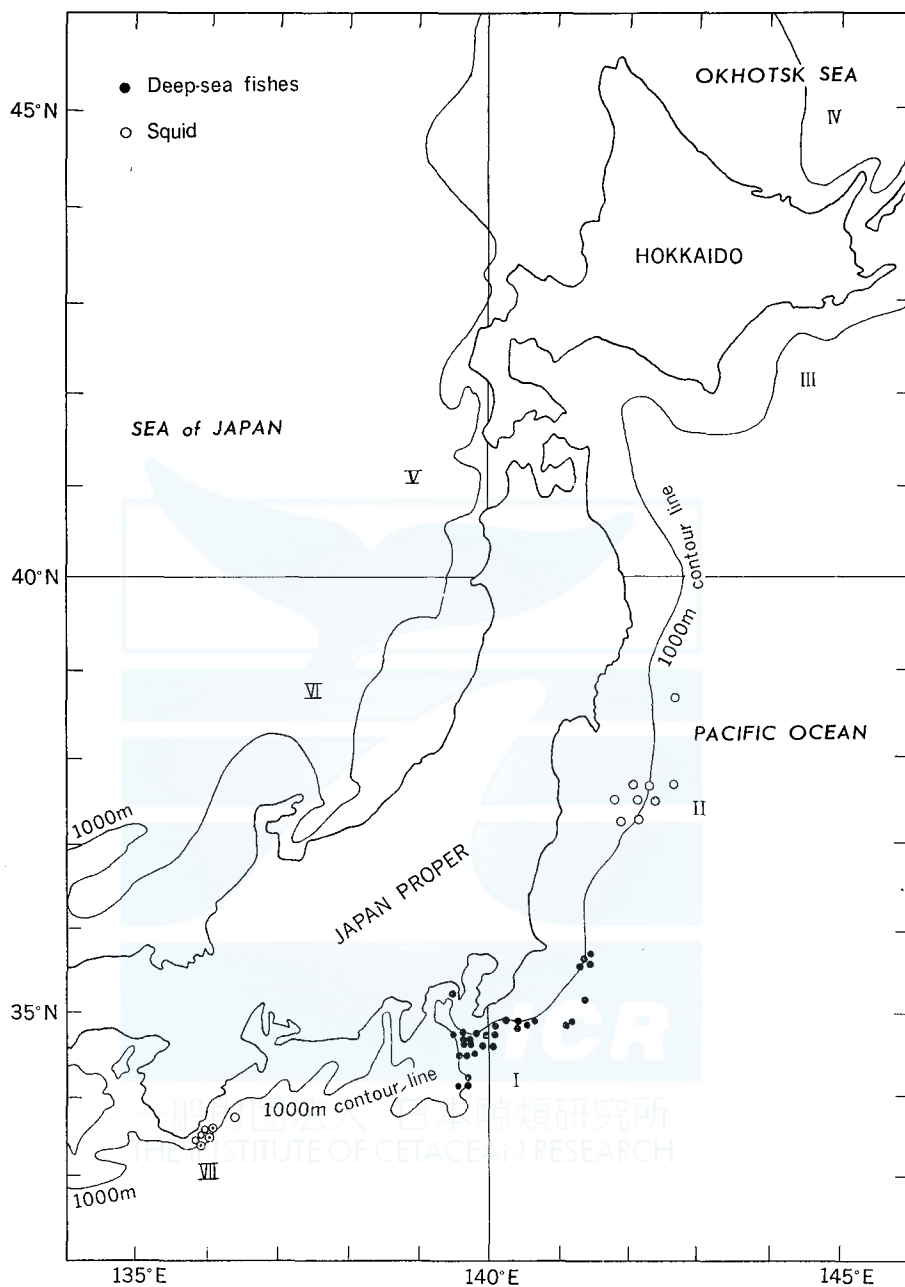


Fig. 3. Position of catch of *Ziphius cavirotris* with stomach contents, 1965-1970.

body length of both sexes from this data are greater than those in the data of Omura *et al.*

Considering that the number of new whaling boats has been decreasing con-

tinually, possibly, if the population remains in its apparently stable condition as at present, this industry may not endanger the *Ziphius* stock. Our estimate of a permissible quota, based on Omura's paper and the consistency of the average body length over the years is in the region of 30-50 animals, regardless of age or sex.

ACKNOWLEDGEMENT

We are grateful to the members of the Whaling Administration Section of the Fisheries Agency for allowing their data to be used in this report.

We would also like to thank the staff members of the Biology of Fisheries Resources Division of the Ocean Research Institute, the University of Tokyo and Mr. T. Kubota of the Fuji Suisan Co. for their helpful advice.

REFERENCES

- HOUCK, W. J., 1958. Cuvier's beaked whale from northern California. *J. Mamm.*, 39(2) : 308-309.
- NISHIWAKI, M., 1965. *Whales and Pinnipeds*. Univ. of Tokyo Press, Tokyo, 439 pp. (in Japanese).
- NISHIWAKI, M. and N. OGURO, 1971. Baird's beaked whales caught on the coast of Japan in recent 10 years. *Sci. Rep. Whales Res. Inst.*, 23 : 111-122.
- OMURA, H., K. FUJINO and S. KIMURA, 1955. Beaked Whale *Berardius bairdi* of Japan, with notes on *Ziphius cavirostris*. *Sci. Rep. Whales Res. Inst.*, 10 : 89-132.

