HUMPBACK WHALE SONGS FROM THE NORTH INDIAN OCEAN

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INTRODUCTION

It is generally thought that humpback whales (*Megaptera novaeangliae*) make seasonal migrations (Mackintosh, 1965). In both hemispheres they usually spend the summers at latitudes between 50 and 65 degrees, whereas during winter, when breeding takes place, they are usually found between 10 and 30 degrees (Mackintosh, 1965). Concentrations of humpbacks in summer are closely related to the abundance of the small fish and large plankton that they eat (e.g., Whitehead et al., 1980). During winter humpbacks feed little, if at all. In the West Indies they gather on shallow banks close to deep water (over 2,000 m) south of their major breeding areas (Whitehead and Moore, 1982). These banks all have substantial areas of flat floor between 15 and 60 m deep, with surface water temperatures between 24 and 28 degrees Celsius (Whitehead and Moore, 1982). A cursory inspection suggests that these attributes are generally possessed by humpback wintering areas in other oceans.

It is in winter, and on these banks, that the remarkable humpback songs are heard. The songs are a distinctive continuous sequence of vocalizations conforming to a set of rules (Payne and McVay, 1971). To date almost all the singers that have been sexed have been found to be males, and research by Tyack (1981) off Hawaii relates singing to mating. Singing is almost never heard in summer months on the feeding grounds (e.g., Perkins and Whitehead, 1977). Songs from the Atlantic and Pacific Oceans follow similar rules but differ in specific content (Payne et al., 1983; Winn et al., 1981).

Sightings of humpback whales in the North Indian Ocean are scarce: observations from merchant ships are few and scattered both geographically and temporally (Biran, 1957; Smijper et al., 1964). There are no humpback kills from the northern Indian Ocean marked on the charts of Towsend (1935). However Smijper et al. (1964) report calf sightings from the area. According to Wrav and Martin’s (1983) review of 19th century Yankee whaling in the West Indian Ocean most humpbacks were caught near the equator, or off Madagascar.
WRAY and MARTIN (1983) do not mention any humpback catches from the coast of Oman, although whaling for sperm whales (*Physeter catodon*) was common there. But, in his review of recent marine mammal sightings off Oman, ROSS (1981) comments on convincing reports by fishermen of humpback whales off Masirah (20° 30'N, 58° 50'E) in September and October: it is likely that these are humpbacks migrating between summer feeding and winter breeding grounds feeding on sardines which are abundant in this region during these months.

The North Indian Ocean is unique in having no temperate or arctic waters. Most important questions are whether the humpbacks sighted there are breeding, feeding or both, and whether they are contained entirely within the North Indian Ocean, or migrate to Antarctic or North Pacific waters. The presence and seasonality of their songs is significant evidence in attempting to determine these issues.

**METHODS**

The research reported here was undertaken as a side project of the World Wildlife Fund — IUCN Indian Ocean Sperm Whale Project. The study was divided into four seasons:

- January — April 1983: Off Sri Lanka
- October — December 1983: Off Sri Lanka, Maldives
- February — June 1984: Maldives — Sri Lanka — Seychelles — Aden

The routes taken are shown in Fig. 1.

While on passage, each three or four hours (approximately 20–25 km) we would have to lower a hydrophone, and listen for marine mammal sounds. We did not listen during a part of the passage from the Seychelles to the Gulf of Aden during June 1984 due to poor weather conditions. In the areas off Oman and Sri Lanka, where we were performing more detailed research, routine monitorings were performed every hour or half hour. The acoustic equipment consisted of Bencher AQ17 hydrophones with built-in preamplifiers lowered to 10 m, and a Uher 4200 tape recorder.

**RESULTS**

Table 1 lists those areas that we passed through, or performed research in, which had similar characteristics to the Banks off the West Indies where humpbacks sing as described by WHITEHEAD and MOORE (1982). Humpback songs were heard in Kula Maria Bay, Oman, on 15—17 January 1982, and in the eastern half of the Gulf of Oman, Sri Lanka, on a number of occasions between 19 February and 10 March 1982. In Fig. 1 the Gulf of Oman is divided into 30° longitude rectangles, and those in which humpback sounds were heard are marked.

Songs were recorded both off Oman and in the Gulf of Oman, and have been analysed by Katherine Payne. She confirms that both have the characteristics of songs made by humpbacks, and follow similar rules to those recorded from the Atlantic and Pacific. The content of the songs is different from the Atlantic or Pacific, but the songs from Oman and Sri Lanka have virtually the same content. A detailed comparison of these songs to those from other oceans will be presented in due course.

During the research there were no definite sightings of humpbacks.

**DISCUSSION**

The similarity of the songs from Oman and Sri Lanka parallels the situations in the North Atlantic and North Pacific. Songs from the West Indies and Cape Verde Is-

**Fig. 1.** The survey routes taken by Tups in the Northwest Indian Ocean. Positions where humpback songs were heard are marked (O). An inset showing the Gulf of Mannar is divided into 30° latitude by 30° longitude rectangles. Those where humpback songs were heard are marked (O), those where underwater acoustic monitorings were carried out during February and March 1981, but no humpback songs were heard are marked (O). The route line is broken for the part of the voyage between the Seychelles and the Gulf of Aden during which time no underwater acoustic monitorings were carried out on account of poor weather.
Table 1: Areas apparently suitable for humpback whale songs which were acoustically surveyed by FAO. They were all on or near areas of the bottom less than 100 m deep, with water temperatures between 22–28 degrees Celsius. Humpback whale songs were heard off the Kura Maria Islands, Oman, on 15–17 January 1982 and on a number of occasions in the Gulf of Mannar, Sri Lanka, between 19 February 1982 and 10 March 1982.

<table>
<thead>
<tr>
<th>Place</th>
<th>Lat</th>
<th>Long</th>
<th>Date</th>
<th>Humpback Songs Heard?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banks off Bas</td>
<td>12° 15′N</td>
<td>51° 00′E</td>
<td>Jan 1982,</td>
<td>No</td>
</tr>
<tr>
<td>Achi, Somalia</td>
<td></td>
<td></td>
<td>June 1984</td>
<td>No</td>
</tr>
<tr>
<td>Ras Farik, South Yemen</td>
<td>13° 32′N</td>
<td>52° 45′E</td>
<td>Jan 1982,</td>
<td>No</td>
</tr>
<tr>
<td>Off Salalah, Oman</td>
<td>16° 55′N</td>
<td>54° 16′E</td>
<td>Jan 1982</td>
<td>No</td>
</tr>
<tr>
<td>Kuria Mala Is, Oman</td>
<td>17° 32′N</td>
<td>55° 52′E</td>
<td>Jan 1982</td>
<td>Yes</td>
</tr>
<tr>
<td>Ras al Mafzaka, Oman</td>
<td>18° 55′N</td>
<td>57° 48′E</td>
<td>Jan 1982</td>
<td>No</td>
</tr>
<tr>
<td>Cova Dho, India</td>
<td>13° 50′N</td>
<td>72° 10′E</td>
<td>Feb 1982</td>
<td>No</td>
</tr>
<tr>
<td>Wedge Bank, India</td>
<td>8° 20′N</td>
<td>76° 30′E</td>
<td>Feb 1982</td>
<td>No</td>
</tr>
<tr>
<td>India</td>
<td></td>
<td></td>
<td>Nov 1983</td>
<td>No</td>
</tr>
<tr>
<td>Gulf of Morom, Sri Lanka</td>
<td>7° 10′N</td>
<td>79° 40′E</td>
<td>Feb 1982</td>
<td>Yes</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td></td>
<td></td>
<td>Jan 1983</td>
<td>No</td>
</tr>
<tr>
<td>East Coast of Sri Lanka</td>
<td>8° 15′N</td>
<td>71° 40′E</td>
<td>Apr 1983</td>
<td>No</td>
</tr>
<tr>
<td>Maldives Islands</td>
<td>5° 00′N</td>
<td>76° 00′E</td>
<td>Dec 1983</td>
<td>No</td>
</tr>
<tr>
<td>Banks North of Chagos</td>
<td>5° 05′S</td>
<td>70° 40′E</td>
<td>May 1984</td>
<td>No</td>
</tr>
<tr>
<td>Seychelles Islands</td>
<td>4° 35′S</td>
<td>55° 50′E</td>
<td>June 1984</td>
<td>No</td>
</tr>
</tbody>
</table>

The evidence presented in this paper, together with that from the literature, suggests that there is a population of humpback whales which stay entirely within the Northern Indian Ocean. Because of the upwellings off the Arabian and Sri Lankan coasts they would need to make only short migrations between suitable feeding and breeding areas. If this were the case they would be spending their entire lives within the Indian Ocean Whale Sanctuary.

However, there is no evidence that this North Indian Ocean population is very numerous. Both off Oman and in the Gulf of Mannar we only heard single, and usually very distant, singing whales. This is in complete contrast to the areas off the West Indies where the northwest Atlantic population winters. On Silver Bank many songs can be heard simultaneously through hydrophones at any time during February and March (WHITEHEAD and MOORE, 1982). There may be considerable concentrations of humpback whales in the North Indian Ocean during winter, but we did not locate them.

SUMMARY

Humpback whale songs were heard off Oman in January 1982, and in the Gulf of Mannar, Sri Lanka, during February and March 1982. The songs recorded in these two locations were similar to one another, but different to those from the North Atlantic or North Pacific. This, and other evidence, suggests that there is a small population of humpbacks which spends the whole year within the N Indian Ocean.

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