

## Studies on the Underwater Sound-V

### On the underwater calls of the Indus River Dolphin (*Platanista gangetica*)

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Recording of the underwater call and observation of the relative behaviour of the river dolphin (*Platanista gangetica*) living in the Indus River were carried out. All of the underwater calls emitted by this dolphin were clicks which were continuously emitted. This call was mainly used for echolocation and, when small fishes were thrown into the pond, it was observed that the repetition rate of clicks emitted by the dolphin searching for bait rapidly became higher. The repetition rate was 30-200/sec. (usually 40-100/sec.) The analyzed patterns were monotonous and the particularly strong frequency band was not constant.

The clicks emitted by the Indus River Dolphin were very similar to the call of the dolphin living in the Ganges River, but the stratiformed sound, burst, twitter and whistle which the Ganges River Dolphin emitted were not observed with the Indus River Dolphin.

#### INTRODUCTION

As compared with the ocean dolphins the survey of which is considerably advanced, it seems that the calls of the fresh water dolphins are mostly monotonous. It is supposed that the underwater calls emitted by the dolphins living in the Indus River and the Ganges River, well known as the blind dolphins, are frequent and many in kind. Furthermore, it seems that the particular shape of the skull acts heavily on the acoustic behaviour.

Fortunately, in December 1974, we had an opportunity to conduct many kinds of observations of the river dolphin living in the Indus River in Pakistan. As a part of the investigation, the observation on the acoustic behaviour of this dolphin was carried out.

On the acoustic behaviour of this dolphin, Herald et al (1969)<sup>1)</sup> described that the dolphin always emitted the underwater calls and the main frequency band was 15-60 KHz. There are hardly any other reports. Mizue et al (1971)<sup>2)</sup> described

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that the river dolphin of the same species living in the Ganges River also emitted many calls. Because the Indus River Dolphin has long had no interchange with the Ganges River Dolphin, it is thought to be of great interest from the point of view of ecology and taxonomy if there are any differences in underwater calls between those river dolphins.

## METHODS

It seems that many river dolphins live in the middlestream of the Indus River, especially in deep or sinuous places. The existence of this dolphin is recognized only by its appearance to the surface for breathing since the river water is muddy assuming light brown color and its transparency is only several centimeters.

It was found out that several dolphins were living in an inlet (about 50 meters long and about 30 meters wide), as shown in Fig. 1, in the middle stream of the Indus River.

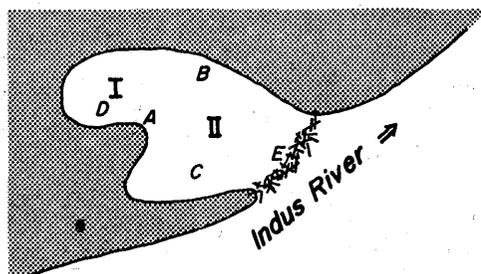


Fig. 1. The pond observed calls of Indus River Dolphin.

It seems that the inlet was separated from the main stream by the driftwoods (coppicewoods) (E) and the dolphins could hardly pass through the entrance. Like the bank of the Indus River, the surroundings of this inlet also consist of very fine sand and the bottom is of muddy. Walking in the inlet makes the water more turbid and it becomes more difficult to observe the dolphins. All of those dolphins in the inlet were about 1 meter in body length, although larger ones seemed to live in deep places of this river. This inlet is divided by a shallow part (A-B), which, however, has sufficient depth for the dolphins to freely swim through. The center of the part I is deeper than that of part II, but shallower than 2 meters. Approach of people during the daytime is sometimes seen around the part I but hardly around the part II.

Two observations were carried out for this investigation; one method was on the diurnal variation and the characteristics of the underwater calls, and the other was on the underwater calls of this dolphin in the natural condition at the deep places of the main stream. In the former method, a post was put up at point C and the hydrophone was suspended at 10 - 20 cm of depth from the bottom. Then, another post was prepared at point D. The observations were carried out for 10 minutes at intervals of 30 - 60 minutes in a total of 27 hours from 16:00 to 19:00 of the next day. After the observations, the driftwoods were taken away and the dolphins were released to the main stream.

The instruments for these observations were SONY's model "TC-2850SD" tape recorder, OKI's model "57-TA-2" hydrophone, OKI's model "ST-65" pre-amplifier and SONY's model "C90-CR" tapes. The recorded sounds were analyzed by RION's model "SG-04A1" sound spectrograph.

## ANALYSIS AND DISCUSSION

As observed through the hydrophone at point C, the underwater calls emitted by this dolphin were vigorously heard in the day time, which decreased with the sunset and completely ceased in the night time. Then, the calls became vigorous again with the sunrise and decreased again with sunset. Upon moving the position of the hydrophone to point D, the underwater calls were heard also in the night time same as in the day time. It was recognized that, in the day time, these dolphins lived in part I with less approach of people, but they moved to deeper part II in the night time when there was no people around and then moved to part I with the sunrise. It could not be observed whether or not the frequency and the kind of underwater calls emitted varied with these movings in the morning and evening.

### CALLS

All of the underwater calls emitted by this dolphin were so-called "clicks". The prey searching calls on the breeding sounded strange but these calls were also clicks with very high repetition rate. It was recognized that the use of the clicks by the Indus River Dolphin as compared with the Ganges River Dolphin was much more frequent. The calls other than clicks emitted by the Ganges River Dolphin were 13% of the whole calls in the water, although this dolphin was caught in Bangradesh and recordings were carried out under the breeding condition in Japan. Anyway, it is easily understood that the river dolphin living in these two rivers mainly uses the "Clicks" in view of the limited usefulness of eyesight for the muddiness of river water that is the life environment of this dolphin. Furthermore, the analyzed pattern of clicks of both dolphins much resembled and it is very difficult to find any significant difference. It is also common with the both river dolphins that the frequency components are similar to that of white noise having no special strong frequency band. It may well be said that the both dolphins vigorously emit clicks of few patterns in kind.

The repetition rate of these clicks varies within the range of 30-200/sec. (usually 40-100/sec.). It seems to be an evidence of using these clicks for echolocation that the repetition rate rapidly increases when searching the bait like in the ocean dolphins.

The underwater calls of the Indus River Dolphin encountered in our downward cruise were also recorded and analyzed. However, these natural calls consisted of only clicks and there was no differences in analyzed pattern from that of the dolphin bred in the inlet. It is assumed that this dolphin is emitting the underwater calls all day long at almost the same intervals since those underwater calls were always heard when the dolphin was found and the hydrophone was suspended immediately.

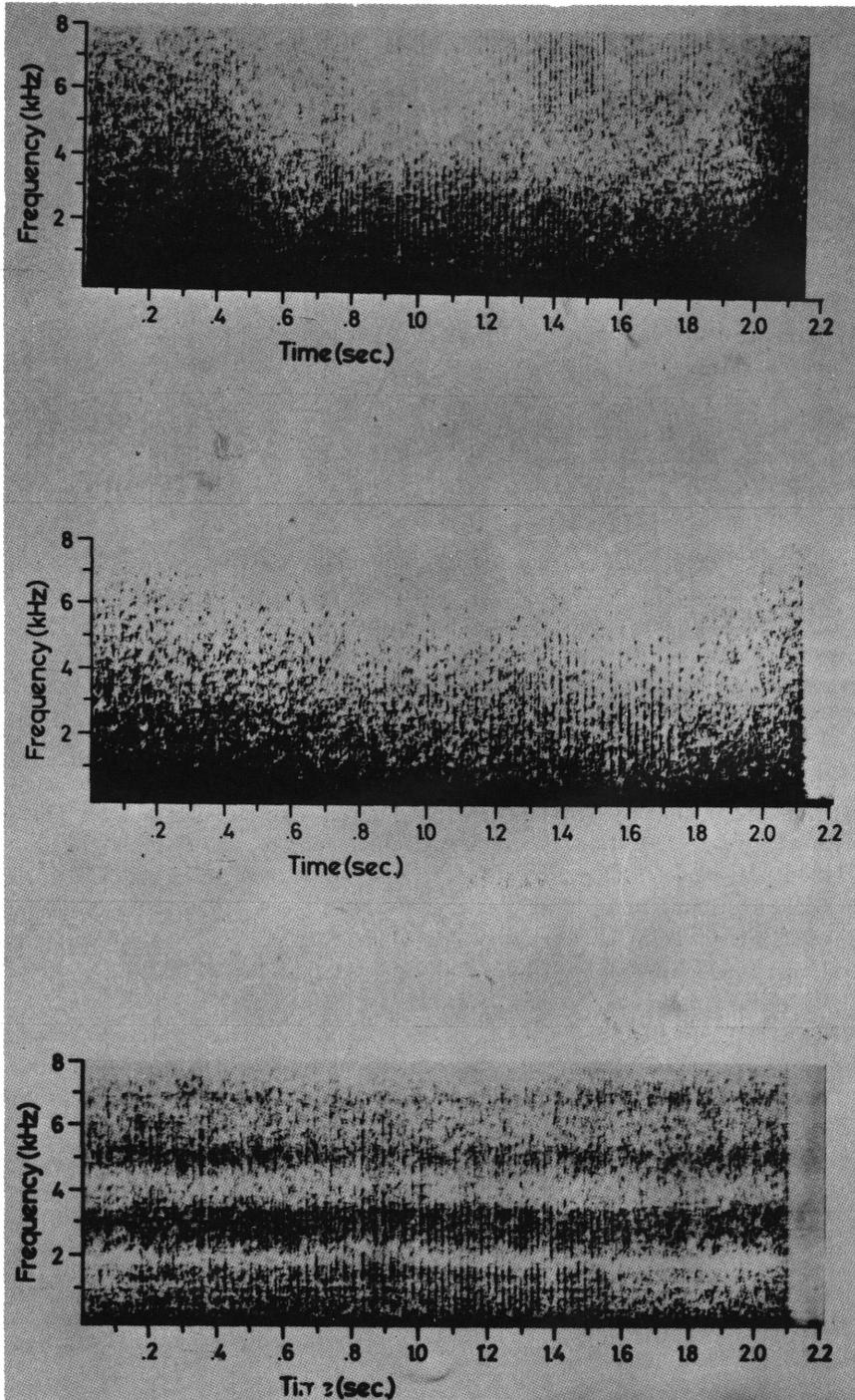


Fig. 2. The underwater calls of Indus River Dolphin.

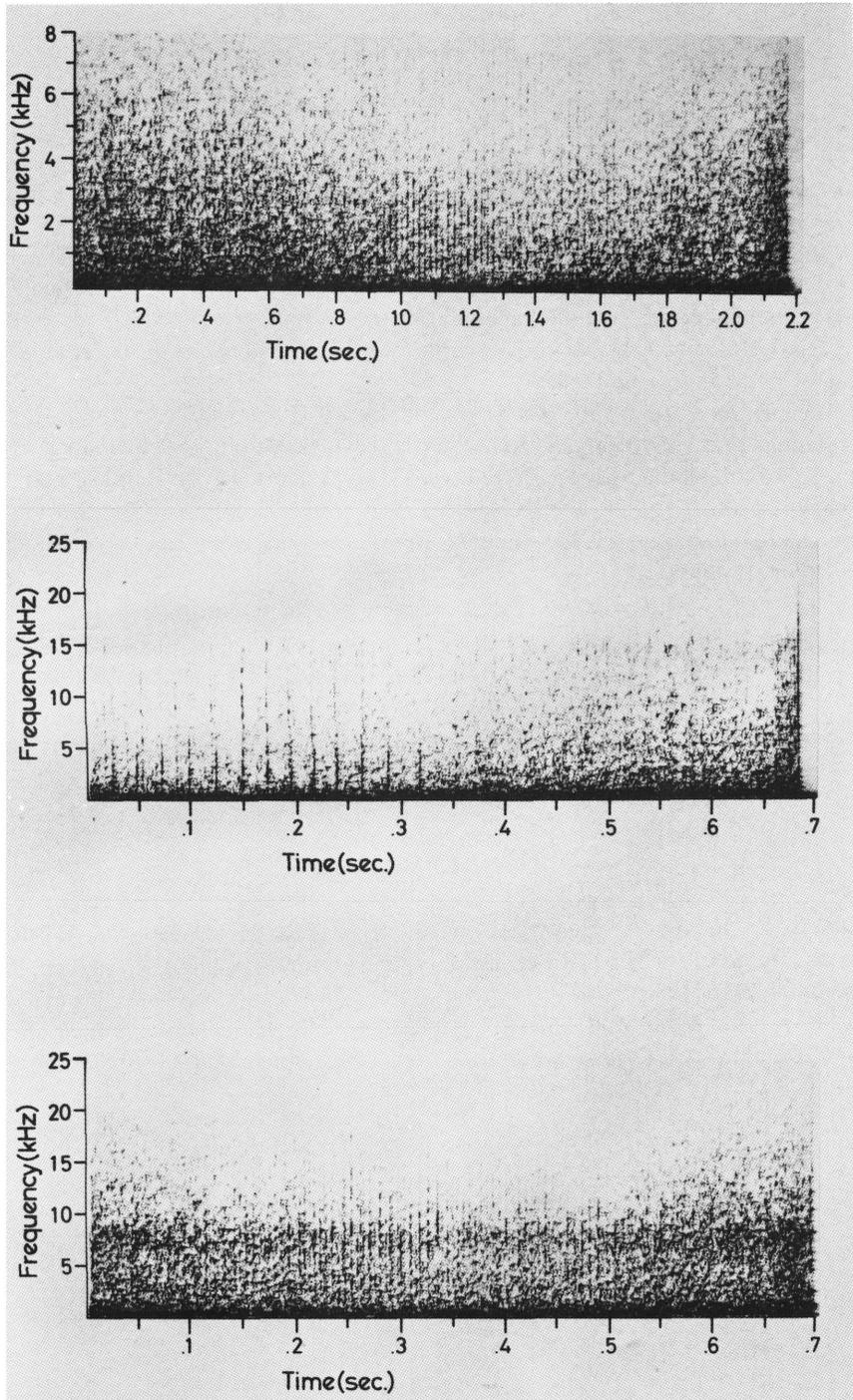


Fig. 3. The underwater calls of Indus River Dolphin.

## SUMMARY

1. The underwater calls of the Indus River Dolphin were recorded in Pakistan were compared with that of the Ganges River Dolphin of the same species.
2. This dolphin lives at deep places and sinuous places of the Indus River and is always emitting the calls.
3. The emitting interval of underwater calls almost constant all day.
4. All of the calls of the Indus River Dolphin are of the type of so-called "Clicks" and play an important role in echolocation.
5. The analyzed pattern of these calls are monotonous and no special strong frequency band is recognized.
6. The repetition rate is 30-200/sec. (usually 40-100/sec.).
7. Regarding that the Ganges River Dolphin was under the breeding condition, the clicks of the Indus River Dolphin and the Ganges River Dolphin may have no difference at all.
8. Other calls observed in the Ganges River Dolphin were not recognized in the Indus River Dolphin.

## ACKNOWLEDGMENT

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## REFERENCES

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