Reaction of toads to different sounds

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Abstract

Last year, I became interested in toads' hearing ability, so I examined whether toads hear sounds or not. Female (♀) toads reacted more to the rising sounds than males (♂) did. This results may have something to do with the course of breeding. Furthermore, the hearing range of toads may be similar to that of bullfrogs.

Introduction

In previous experiments, toads didn't react sounds of a certain frequency, to the big sound, but she reacted to the rising sounds of 20-1000Hz. This time, I increased the number of toads from one to two, and experimented (ex.1) and in another way (ex.2) to better research whether toads hear the sounds or not (ex.1) and to find out a toads' hearing range (ex.2).

About toads(Bufonidae, Anura, Amphibia)

I caught both of them in my garden.

- A♂, about 7 months ago
- B♀, about 18 mouths ago

About heart beats

In this experiment, visible heart beats are not equal to heart rates. Heart beats could be seen when toads eating worms, being caught by people, restricting their vision. In general, toads' heart rates are difficult to measure, so we will count visible heart beats instead.

Experiment 1

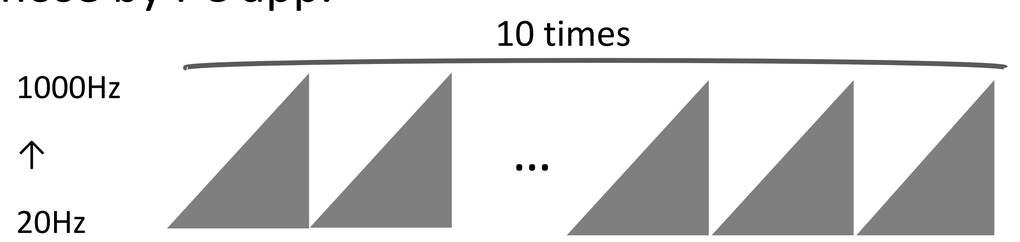
①make 20-1000Hz sounds by PC app
②make toads hear the sounds (about 20 second)
③count the number of heart beats
④ ②③ × 5 calculate average of heart beats

Experiment 2

①make 5000-7000Hz sounds by PC app
②-④ the same way as experiment 1

About making sounds

I recorded 20-1000Hz and 5000-7000Hz sounds made by smartphone app, and multiplied and connected those by PC app.



Results 1,2

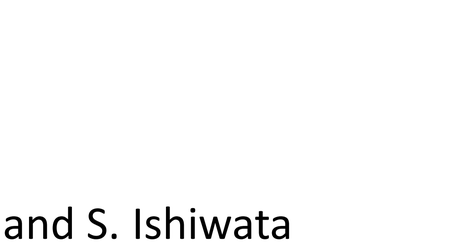
The average visible heart beats when toads hear sounds of 20-1000Hz

	A(♂)	B(♀)
November	0	1
December	0	1.6
January	0	1.3

when considering the results, I think little about the individual difference.

The average visible heart beats when toads hear sounds of 5000-7000Hz

	A(♂)	B(♀)
November	0	3
December	0	0
January	0	0



Discussion

- There may be a possibility that there is a gender difference in hearing.

Only male toads cry and females approach males, reacting to males' crying when breeding. These results may have something to do with this breading methods.

- Toads' hearing range may be similar to bullfrogs'.

According to references, bullfrogs' hearing range is about 100-2000Hz and the results show that toads didn't react to sound of 5000-7000Hz except in November.

- B's reaction in November is likely anomalous result.

Outlook

- Change the sounds that toads hear and change the way I observe them.
- Increase the number of toads or do some field work.

References

[1] Active role of the hair bundle on a frog's hearing , Yokohama National Univ. , M. Kobayashi and S. Ishiwata
カエル聴覚における感覚毛の能動特性（jst.go.jp).
[2] Biology on toads , Shokabo , Akihisa Ueno and Katsutoshi Ishihara.