SEX AND EAR SIZE IN THE BULLFROG

E. NORBERT SMITH*

*Ear sixes differ significantly in male and female frogs, **Rana catesbeiana.** If ears are a means of warning of impending predation, one would expect the ears of both sexes to be the same size. Or, if hearing is essential in feeding behavior no difference in ear size would be expected. Actually male frogs of this species possess greater hearing capability than female frogs. Research is mentioned, and relevance of all these ideas to a creationist framework is explicated.*

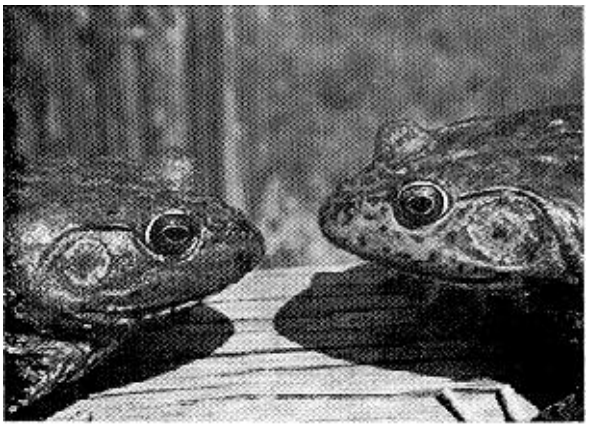

Figure 1. Male and female bullfrog, *Rana catesbeiana.* Male on the right has a much larger tympanum or eardrum than the female. This is reversed from what is expected if the primary function of the male's chorus is to attract females for breeding. Photograph by E. Norbert Smith.

So obvious is the difference in ear size of the bullfrog, *Rana catesbeiana,* that the sex can be determined visually before collecting the animals, according to Conant,[1] "The tympanum (eardrum) is larger than the eye in males, and only the size of the eye or smaller in females." Why this sexual dimorphism? Can it be of any possible help in reaching some conclusion about the animal's natural history?

Certain Expectations Considered

Other things being equal, there is a positive correlation between ear sensitivity and the "capture area" or cross sectional area of the tympanum. Apparently then male bullfrogs would hear better than females.

Yet, if the frog's ears served primarliy as warning of impending predation, one would expect the ears of both sexes to be the same size as both male and female are victimized by the same attackers. Or alternately, if hearing is essential in feeding behavior no difference in ear size would be expected.

Many anurins have a characteristic species specific call. That the call of a male frog will hold a greater attraction for females of the same species than for other frogs has been demonstrated repeatedly. The call then serves at least two functions (besides some possible aesthetic quality): that of genetic isolation (to keep a kind a kind) and to attract a mate. If these are the most important uses of the call (and ears) one would expect the female (who must be attracted) to have the larger ears.

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Facts and Interpretations Compared

However, the facts of natural phenomena are not dependent upon men's ideas. Contrary to the expectation just stated that female frogs would have the larger ears, male frogs possess the greater hearing capability, as though the male was calling not so much for the female but to other males.

This fits nicely into a creationist framework involving intrinsic population control instead of an evolutionary viewpoint with an inherent obligate wide-open reproduction. As has been previously stated,[2,3] a literal interpretation of the perfect creation prior to the fall would preclude predation and necessitate some kind of built-in population control. Conceivably the fall brought many changes including, disease, starvation and predation. But, possibly, traces of the original intrinsic population control are still active and can be found today.

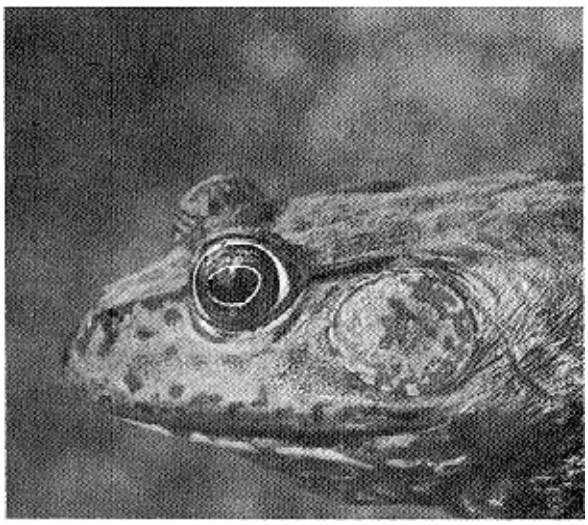

Figure 2. This is a close-up of a male bullfrog. Photograph by E. Norbert Smith.

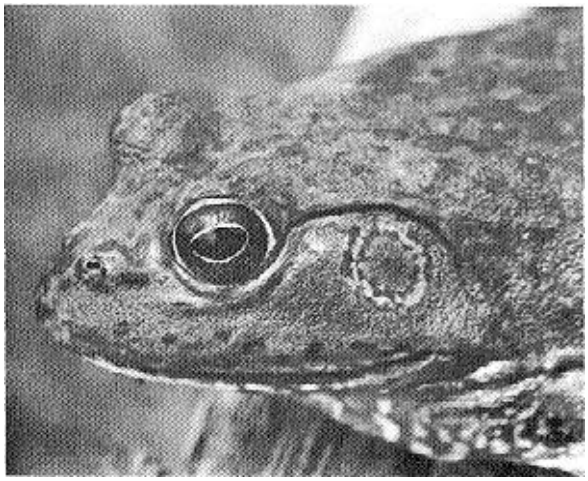

Figure 3. This is a close-up of a female bullfrog. Clearly the female has a much smaller ear than the male. Photograph by E. Norbert Smith.

Wynne-Edwards has convincingly stated[4,5] that the call of the bullfrog is an epideictic display shared by a multitude of other species—the function of which is simply a head count or census. Evidently by means of the census, recruitment rate and finally density of the species are regulated. In a test[6] of a prediction by Wynne-Edwards, the primary function of the bullfrog's call has been found to be territorial, resulting in a parcelling out of living space so common among passerine birds.

Research Problem Suggested

The hypothesis relating bullfrog reproduction and the hearing of other bullfrogs calling could be tested by comparing density and reproductive success of two groups of frogs. One group could be artificially (and humanely) deafened or made mute and the control group left intact. Even in creation research "the fields are white unto harvest."

References

[1]Conant, Roger. 1958. A field guide to reptiles and amphibians. Houghton Mifflin Company, Boston, p. 287.
[2]Smith, E. Norbert. 1970. Population control: evidence of a perfect creation, Creation Research Society Quarterly, 7(2):91-96.
[3]Smith, E. N. 1973. Crowding and asexual reproduction of the planaria, *Dugesia dorotocephala, Creation Research Quarterly*, 10(1):3-10.
[4]Wynne-Edwards, V. C. 1962. Animal dispersion in relation to social behavior. Hafner Publishing Co., N. Y.
[5]Smith, E. Norbert. 1969. Book review. *Creation Research Society Quarterly*, 6(1):73-74.
[6]Wiewandt, Thomas A. 1969. Vocalization, aggressive behavior, and territoriality in the bullfrog, *Ram catesbeiana, Copeia* 1969 (2):276-285.

EVOLUTION AND ARCHAEOLOGICAL INTERPRETATION

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The few hundred years after the flood are crucial years for anyone who believes in a young earth; for in that time populations had to increase and disperse, and the arts and crafts of civilization had to be taken up again, after the destruction of the former order. The author shows that, in fact, the interval need not have been very long. In particular, no more than about 200 years need be allowed between the flood and the beginning of the dynastic period in Egypt.

Introduction

Evolution is commonly thought of as the counter-idea to the concept of creationism. This is altogether true, but evolution is more than this. Acceptance of evolution entails denial of the factual nature of the Noachian Flood.

Also interpretations in the field of archaeology, a discipline that involves the later history of man's existence, have been greatly influenced by the principle of uniformitarianism. A failure on the part of many creationists to recognize this situation has undoubtedly been a significant factor in not submitting archaeological interpretations to a critical scrutiny before acceptance, when such interpretations result in compromise of the dependability of Scripture.

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Because of this situation, proponents of creationism have been in an inconsistent and indefensible position. The number and magnitude of such discrepancies between Scripture and archaeological interpretation are now so great as to give substance to the claims of some archaeologists that Scripture is not a reliable historical source.

If Scripture does contain repeated errors and inaccuracies for the later period of history, then a basis remains for questioning the dependability of the Genesis accounts of creation and the flood. Without doubt, because of numerous compromise interpretations, many people, who would prefer to retain a confidence in Scripture, have turned to such views as theistic evolution and a pre-Adamic creation; or have resorted to acceptance of an extended time period for man's existence which is far out of line with Biblical teaching.