PHONOTAXIS BY FEMALE MAJORCAN MIDWIFE TOADS, ALYTES MULETENSIS

by

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Summary

Female choice based on male call characteristics has been experimentally demonstrated in a number of species of anurans. In the Majorcan midwife toad, the male performs parental care by carrying the eggs in a string around his hind legs until they are ready to hatch. Both sexes produce calls to advertise sexual receptivity and both show phonotaxis towards the calls of the opposite sex. We used two-choice phonotaxis experiments to investigate whether females assess male caretaking ability using variation in call characteristics. Both call frequency and call duration are good indicators of male size, a characteristic that potentially influences the ability of males to successfully brood a clutch. Variation in call repetition rate and call intensity may also reflect differences in male caretaking ability, given the high energetic demands of calling behaviour in anurans. We predicted that females should prefer to mate with larger males and that this would be manifest in selective phonotaxis to low frequency and/or long duration calls. We also predicted that they would prefer calls produced at a fast rate and a high intensity. Contrary to our predictions females did not prefer lower frequency calls, longer calls or louder calls. They did however, selectively approach calls produced at a faster rate. These results are discussed in the context of sexual selection theory.

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Introduction

The Majorcan midwife toad, *Alytes muletensis*, is one of four species of midwife toad distributed throughout Western Europe. *A. muletensis* is found only on the Mediterranean island of Mallorca where populations are largely restricted to a few deep limestone gorges. Like other midwife toads, *A. muletensis* is a terrestrial breeder with prolonged and complex mating behaviour. Both males and females produce short, low intensity advertisement calls. Females respond phonotactically to male calls and may vocalize themselves while locating a male (Bush, 1993). Once a female locates a male the pair enter amplexus and, after an elaborate sequence of movements, the female produces a rosary of eggs which the male fertilizes and then twines around his hind legs. The male remains on land and carries the eggs for the duration of embryonic development (19-64 days; Bush, 1993). Although the courtship behaviour of *A. muletensis* has been studied and described in detail (Bush, 1993), little is known about female mate choice in this species. The fact that males provide parental care by carrying the eggs until they are ready to hatch and that parental care is provided independently of site attachment (Bush, 1993), suggests a potential role for female mate choice based on male caretaking ability.

There are two types of cue that females could use in assessing male caretaking ability. First, the complex and prolonged courtship may provide females with information about the ability of a male to perform activities required for successful brooding. The energy expenditure of males during courtship is probably substantial and if endurance is correlated with successful brooding of eggs, then females may use this cue as a means of selecting a good caretaker. Since females are able to displace males at any point during the courtship ritual (Bush, 1993), they can reject males before the transfer of gametes takes place so that their choice need not be irreversible. Second, it is possible that females choose among males on the basis of differences in the advertisement calls of individuals. Evidence for female preferences based on differences in call frequency, repetition rate, intensity and duration now exists for several anuran species (*e.g.* Ryan, 1985; Klump & Gerhardt, 1987; Telford *et al.*, 1987; Dyson & Passmore, 1988; Passmore *et al.*, 1992).

In *A. muletensis*, call frequency and call duration are correlated with male body size, with larger males having lower frequency, longer calls than small