Intraspecific Variability in the Tapping Behavior of the Deathwatch Beetle, *Xestobium rufovillosum* (Coleoptera: Anobiidae)

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Taps were recorded from 46 male and 30 female deathwatch beetles, *Xestobium rufovillosum*. Beetles tap by striking the frons of the head on the substrate 4–11 times, at a frequency of about 11 Hz. There were no significant differences between the sexes in the number of strikes per tap, or in the frequency of the strikes, although there was significant variation between individuals of both sexes in both of these parameters. Males usually initiate a sequence of taps, to which females reply. Females responded more readily to male beetle taps containing high strike numbers. Use of an artificial tapper showed that females responded most to taps containing at least six strikes. Females did not discriminate between male beetle taps on the basis of strike frequency, although at abnormally high (20-Hz) or low (4-Hz) frequencies produced by the artificial tapper, females were less likely to respond. Male beetles located the source of taps from the artificial tapper and did this more readily with taps of a high strike number. It is not clear why some males produce taps with fewer than six strikes, as these are unlikely to elicit a female response, and so should be the subject of adverse sexual selection.

KEY WORDS: deathwatch beetle; *Xestobium rufovillosum*; tapping behavior; mate location; sexual selection; communication.

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INTRODUCTION

It is well-known that adult deathwatch beetles, *Xestobium rufovillosum* De Geer (Anobiidae), tap; records of tapping go back to 1668 (Wilkins, 1668). The behavior has often been considered as a "sex call" (Fisher, 1937, 1938; Hickin, 1963), but until recently there have been no experimental analyses to confirm this (Birch and Menendez, 1991). Birch and Keenlyside (1991) demonstrated that tapping duets of this beetle constitute a substrate-borne communication system between the sexes.

Beetles tap by repeatedly striking the substrate with the frons of the head; each typically consists of 4–11 strikes at a frequency of about 11 Hz (Fig. 1) (Klausnitzer, 1983; Birch and Keenlyside, 1991). Both sexes tap, though in different contexts. Calling males tap, whether alone or in the presence of other beetles of either sex, while females mostly respond by answering other beetles. Females will respond to spontaneous female taps, but most of their replies will be to male taps since males have a higher level of spontaneous tapping. Typically, a male initiates a tapping sequence, to which a female responds, and there follows a sequence of male taps and female replies. Between taps, females usually remain stationary, while males often walk a short distance before resuming tapping. The sequence ends when the male finds the female, by locating the source of her taps and copulation ensues (Goulson *et al*., 1993a,b).

Tapping therefore appears important for mate recognition and location in deathwatch beetles. Females need to be able to recognize male taps and then

![Fig. 1. Sonograph of one deathwatch beetle tap showing individual strikes.](image-url)