Defensive Behavior of Free-Ranging Pygmy Rattlesnakes 
(*Sistrurus miliarius*)

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*Sistrurus miliarius* frequently bites humans in the southeastern United States. We used a large population of *S. miliarius* in central Florida to investigate the importance of several factors on the defensive behavior of this species. Upon detection of a snake, we tapped the snout of the snake with a gloved hand. We recorded whether the snake struck or fled. Our large sample size (*N* = 336) allowed us to make strong conclusions regarding the defensive behavior of this rattlesnake species. Overall, only 27 snakes (8%) bit the glove indicating that this species is rather nonaggressive. Initial posture was the only factor that influenced striking behavior; uncoiled snakes struck significantly more than coiled snakes. Fleeing behavior was affected by three variables: sex; whether the snake was about to shed; and initial posture. Females fled more often than males, as did snakes about to shed. Initial posture is the only factor that affected both response variables, and uncoiled individuals were more likely to flee than coiled snakes.

SNAKES have evolved some of the most elaborate and diverse antipredator mechanisms among reptiles (Greene, 1988). This diversity of antipredator behaviors, combined with the fact that venomous snakes are responsible for approximately 30,000–40,000 human deaths worldwide per year (Russell, 1983), has resulted in increased attention to defensive behaviors of snakes.

Increasing human pressure on the environment, through habitat destruction and fragmentation, and development of outdoor recreation have increased interactions between humans and certain species of animals (Aune, 1991; Lammers et al., 2000). Venomous snakes are among the few species of animals that pose a direct threat to humans. As a result, rattlesnakes have suffered from a reputation of being aggressive and vicious creatures (Klauber, 1972).

Factors that affect the defensive response of reptiles can be partitioned into intrinsic and extrinsic factors. Intrinsic factors to the organism, such as body temperature (Keogh and DeSerto, 1984; Layne and Ford, 1984; Goode and Duvall, 1989), size (Hailey and Davies, 1986; Whitaker and Shine, 1999), sex (Scudder and Burghardt, 1983), recent feeding (Herzog and Bailey, 1987), and experience (Glaudas, 2004) have all been found to affect snake defensive behavior. Extrinsic factors have received less attention. Gibbons and Dorcas (2002) revealed that threat severity was the major element in releasing a striking response in Cottonmouths (*Agkistrodon piscivorus*), and Shine et al. (2002) found that the location of the snakes influenced defensive behaviors.

Field experiments on the defensive behavior of venomous snakes are rare primarily because such studies are logistically difficult (Shine et al., 2002). However, areas with high population densities of venomous snakes provide an opportunity to examine defensive behavior pattern in free-ranging snakes. Our study organism, *Sistrurus miliarius*, occurs at very high density in central Florida. It has been described as fiery and irritable (Allen and Neill, 1950) and is responsible for many snakebites in Florida (Minton, 1987). We took advantage of a large population of *S. miliarius* to obtain adequate sample size and investigate the influence of several factors on the defensive behavior of this species. We determined whether the location of the snake, body size, sex, reproductive condition of mature females, initial posture; whether the snake had an obvious prey item in its gut; and whether the snake was about to shed influenced defensive behavior. The purpose of this study was to investigate whether this snake deserves its aggressive reputation and to determine the factors that influenced snake behavior with the goal of elucidating the adaptive significance of defensive behavior patterns in this small species of rattlesnake.

**Materials and Methods**

**Study organism.**—*Sistrurus miliarius* may be the smallest rattlesnake (typically 40–55 cm total body length; Ernst and Ernst, 2003). In the study population, snakes were active year-round with peaks of activity in March through April and September through November. Snakes in the study population feed mostly on lizards (*An-