REPRODUCTIVE SUCCESS OF COLONIAL AND NONCOLONIAL FEMALE YELLOW-BELLIED MARMOTS (*MARMOTA FLAVIVENTRIS*)

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Previous work comparing reproductive success of colonial and noncolonial yellow-bellied marmots (*Marmota flaviventris*) indicated that noncolonial females had lower fitness; they reproduced less often and their offspring had a lower survival to age 1 year. This work, however, may have been affected by a bias in sampling effort. We initiated a new study and found no significant differences between colonial and noncolonial females in litter size or frequency of reproduction. We did, however, recapture a lower percentage of noncolonial offspring as yearlings; this may have resulted from early dispersal, higher mortality, or both. Further, survival of noncolonial offspring from age 1 to 2 years was lower; the cause probably was a higher dispersal rate of noncolonial versus colonial yearlings, coupled with lower survival of dispersers. We suggest that lower fitness of noncolonial females, as indicated by the apparently lower survival of their offspring and their lower likelihood of recruiting daughters to form matrilines, derives from lower quantity and quality of resources at localities of noncolonial females.

Key words: *Marmota flaviventris*, reproductive success, colony, sociality

Understanding the evolution of sociality in mammals requires an evaluation of fitness costs and benefits of group living (Alexander, 1974). One approach has been to compare social systems among closely related species living in different ecological settings (Barash, 1974; Hoogland, 1981; Jarman, 1974). Alternatively, some species of mammals exhibit variable social systems that range from solitary to group living (Lott, 1991), thereby permitting intraspecific comparisons of the fitness consequences of sociality (Boyce and Boyce, 1988; Cowan, 1987; Packer et al., 1990).

The yellow-bellied marmot (*Marmota flaviventris*) is a large, hibernating, ground-dwelling squirrel that lives in social groups called colonies. Not all marmots, however, are colonial; some lead a relatively asocial existence outside of colonies, variously described as isolated, peripheral, or satellite (Downhower and Armitage, 1971; Svendsen, 1974), herein collectively termed noncolonial. Both behavioral phenotypes, colonial and noncolonial, may exist within the same population; thus, this species exhibits an intraspecific variation in social behavior (Lott, 1991).

Living in a social or a solitary setting may entail different sets of costs and benefits. Armitage and Downhower (1974) compared reproduction and survival between colonial and noncolonial individuals in a population of yellow-bellied marmots located near Rocky Mountain Biological Laboratory, Gunnison Co., Colorado. Mean litter size was similar for colonial and noncolonial females, but frequency of reproduction was about twice as great for colonial females as for noncolonial females. Further, about one-half of colonial young-of-the-year were recaptured as yearlings, whereas noncolonial young were rarely recaptured. Downhower and Armitage (1971) proposed that disappearance of noncolonial young resulted from mortality or early dispersal and concluded that noncolonial females were reproductively less successful