

THE IMPACT OF STERILIZED FEMALES ON ENCLOSED POPULATIONS OF RICEFIELD RATS

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Abstract: For the sustainable management of small mammals, fertility control may be used in the future. Little is known about what proportions of females need to be sterilized to achieve an impact on population size and what compensatory processes may act on the population level. We tested the impact of surgical sterilization of zero, 25, 50, and 75% of females on the population dynamics and demography of enclosed populations of ricefield rats (*Rattus argentiventer*) and damage to rice crop. Sterilizing 50% of female founders (6 of 12) decreased population size at the end of the breeding season by about 50%. We used a simulation model, based on the breeding biology of the ricefield rat in the field and in the control enclosures, to generate the expected dynamics of the enclosure populations. The results suggested that compensation occurred in the enclosures where 75% of female founders (9 of 12) had been sterilized. We detected a slight tendency for 50% higher numbers of recent uterine scars in fertile founder females in the 50% and 75% treatments versus 25% treatments and controls ($P = 0.198$). The primary demographic mechanism for compensation was higher survival of young rats in enclosures where 75% of females were sterilized. However, compensation only partially offset the decrease in population size. We found no conclusive evidence that the reproductive output of F1 generation females was higher when large proportions of female founders were sterilized. Early in the breeding season, the per capita damage to rice plants in populations without sterilized ricefield rats was increased. Our results suggest that the sterilization of >50% of females in ricefield rat populations can reduce rat population growth and rat damage to rice crops.

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