Fertility control of wild mouse populations: the effects of hormonal competence and an imposed level of sterility

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Abstract

We report on a study of confined populations of wild mice in which 67% of females were surgically sterilised to simulate the possible effects of fertility control on population dynamics. Social structure can influence the breeding performance of female mice and, as this may be hormonally controlled, we examined whether the maintenance of hormonal competence by sterilised female mice was necessary to achieve a significant decrease in population size. We compared two methods of surgical sterilisation – tubal ligation, which leaves the animal's reproductive hormone regulation intact, and ovariectomy, which disrupts the normal regulation of the hormones of the pituitary–ovarian axis. There was no difference in the population sizes produced by the two methods of sterilisation and thus the maintenance of hormonal structure is unlikely to influence the population's response to fertility control. If anything, the population response to the presence of hormonally competent but sterile females was different from that expected – populations with tubally ligated females had slightly higher growth rates, recruitment of young, and breeding performance, than populations with ovariectomised females. The 67% level of infertility amongst females in the population successfully reduced population size and growth rate when compared with unsterilised populations. This reduction in population size was not related to the level of sterility imposed. Compensation occurred through improved breeding performance of unsterilised females, particularly in the tubally ligated populations.

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