Crop and urban systems

Fertility effects of a candidate gene for sustainable control of invasive house mice (*Mus musculus*)

Friry, Salomé[1*]; Lindholm, Anna K.[1]; Manser, Andri[1]

[1] University of Zürich, Department of Evolutionary Biology and Environmental Studies, Zürich, Switzerland
* salome.friry@uzh.ch

DOI: 10.20315/evmc.2025.029

There are limited means of sustainably controlling invasive house mice (*Mus musculus*) populations, especially on islands where poison dissemination threatens endemic species and raises welfare concerns. Currently, we are investigating whether the *t*-haplotype, a naturally occurring meiotic driver in house mice, could be used as a more humane and specific alternative for pest control. In *t*-heterozygous males, the *t*-haplotype gains a transmission advantage by "sabotaging" wild-type sperm, whilst *t*-homozygous males are sterile. Therefore, control might be achieved by elevating the frequency of sterile males through the release and reproduction of *t*-carrying males into target populations. To accurately assess the impact of *t*-carrier releases, we measured the *t*-haplotype's fertility effects in both sexes. For males, we studied the sperm's quantity and quality: although fertile, the *t*-heterozygous male samples had lower motile sperm concentration than wild-type. The *t*-homozygous male samples also had lower overall sperm concentrations, with these few cells being mostly static and thus unable to achieve fertilisation. For females, we studied offspring production in the lab: surprisingly, *t*-homozygous females had litter sizes reduced by half compared to wild-type and *t*-heterozygous mothers. The severe fertility costs observed in both sexes suggest that the *t*-haplotype may be a promising tool for pest control. At the same time, we would also expect mice to evolve behavioural strategies such as female polyandry or mate choice to avoid *t*-related fertility costs. We will test this hypothesis in future work.