**Population compensation mechanisms counteract the effectiveness of high-intensity free-roaming cat sterilization - A 12-year city-scale controlled experiment**

Summary

While invasive alien species have been long recognized as the second-largest threat to biodiversity1,2, their population management still constitutes a major challenge in conservation ecology. The domestic cat (*Felis silvestris catus*)—an efficient generalist predator with a fast life-history strategy—functions as an invasive species and is ranked high among the world’s most destructive species 3-6. In addition to the challenges relevant for other invasive species, the great popularity of cats as companion animals3 complicates their population control, replacing the efficient culling strategy with the implementation of a common fertility control method called “Trap-Neuter-Return/Release" 4-6. Surprisingly, despite the global and extensive application of this sterilization strategy, at present, short-term correlative data have primarily been used to assess its efficiency 7. To this end, the long-term consequences of cat sterilization are unknown.

Using data from a twelve-year urban metapopulation-controlled study, we show that significant population reduction can only be achieved when high-intensity neutering is performed in spatial contiguity. Moreover, our ecological approach revealed that even when such conditions are met, the effect of sterilization may be severely impaired by the acceleration of population compensation processes, such as increased reproduction, longevity, and occupancy of immigrant cats. Considering that neutered free-roaming cats continue to hunt 8,9, the study findings cast serious doubts on the effectiveness of cat sterilization in diminishing urban wildlife predation by free-roaming cats. Our results preclude fertility control strategies for controlling populations of fast life-history invasive species, especially when considering the challenge of applying such strategies in natural environments.

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