Gene editing for invasive species control: conservation considerations and knowledge gaps

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In Australia, feral predators, particularly feral cats and foxes, are major threats to biodiversity and have been linked to extinctions of native animals. Current management options are largely based on baiting, yet these efforts are self-limiting as they require ongoing implementation with variable effectiveness in terms of population control. More recently, the gene editing system CRISPR-Cas9 has been proposed as a potential tool for the control of invasive species. This technology has the potential to be a species-specific and non-lethal alternative to current baiting based control options. Considered evaluation of gene editing for invasive species control will involve scientific and community discussion and establishment of regulatory control mechanisms. This will require assessment of risks and benefits and hence a range of information related to biology, ecology and population dynamics of target species in Australian landscapes. We reviewed the current state of biological knowledge of several of Australia's invasive species within the gene-drive context, including feral cats. This provides the opportunity to address knowledge gaps prior to formal evaluation of gene editing as an effective and sustainable strategy for the control of specific invasive species.