
Ecology, physiology and behaviour

Population dynamics as a mediator of improved wild animal welfare from the use of wildlife contraception

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Populations close to their carrying capacity are often suppressed through mechanisms that are likely to affect welfare negatively, such as starvation, intraspecific competition, and disease. Although usually thought of only as a non-lethal approach to population control, wildlife contraception has the potential to improve wild animals' welfare above natural baselines, by averting negative consequences of high population density. Knowing under what conditions average welfare may be expected to increase in a population controlled through the use of wildlife contraception has potential practical implications for the management of wild animals. In general, positive welfare effects of wildlife contraceptives are more likely to occur when reproduction continues unabated and survival is reduced at high densities, and less likely when adults naturally limit immediate reproduction (defined as 'self-imposed fertility control') in favour of somatic maintenance and parental care. Furthermore, wildlife contraception is likely to have the largest positive impact on welfare where large declines in juvenile survival occur between growing and stable population states, and where these declines steepen as populations approach carrying capacity. Lastly, the welfare benefits to already managed populations of wild animals are likely larger when the current methods are expected to cause protracted deaths, such as from the use of rodenticides, compared to other common causes of death for those animals. We present a framework, based on these principles, for predicting how much a given species stands to benefit from wildlife contraception based on its life history strategy and other traits.