

# Elephant contraception: silver bullet or a potentially bitter pill?

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**E**LEPHANT CONTRACEPTION IS INCREASINGLY being identified as a solution to the problem of growing elephant numbers in conservation areas. As a result, it is now being incorporated into elephant management and policy in South Africa. We point out that elephant contraception may have numerous physical, social and ecological side-effects. These side-effects should be identified in advance and their implications incorporated into elephant contraception programmes, in line with the protocols of adaptive management. This provides the opportunity to learn from the process, and may help avoid some of the mistakes made in the course of elephant culling.

Conservation efforts across Africa have resulted in growing elephant populations. This has led to concerns regarding impacts that these elephants may have on biodiversity.<sup>1,2</sup> In response, South Africa recently announced that if other approaches fail, it might resume culling ([www.environment.gov.za](http://www.environment.gov.za)). Zimbabwe, however, is already planning to cull, to

reduce elephant numbers. These announcements have provoked reaction from elephant interest groups. Thirty years ago, culling was seen as the most effective way to manage large elephant populations. Today, however, we are seeing some of the negative consequences of this approach. These include abnormal behaviours that encompass depression, unpredictable asocial behaviour and higher aggression.<sup>3,4</sup>

Contraception is an emerging alternative to culling. Although shown to be effective on a small scale, its practicality is debatable.<sup>5,6</sup> Two key constraints are that three quarters of the female population needs to be contracepted to stabilize population numbers,<sup>3</sup> and that current technology requires frequent darting (two within two weeks, followed by annual re-darting) of the cows.<sup>5</sup> It must also be recognized that contraception cannot reduce elephant numbers in the short term – it will require sustained contraception over a number of years to achieve this. Despite these constraints, elephant contraception is now being incorporated into South African government policy ([\[gov.za\]\(http://www.environment.gov.za\)\), and other elephant range countries may follow this lead. A concern that is being overlooked, however, is that elephant contraception may go beyond controlling reproduction. It could generate unexpected physical, social and ecological consequences. Our understanding of contraception for elephants is now at the stage that elephant culling was 30 years ago, before the adverse effects were recognized. Learning from the culling experience, we feel that at this stage it is important to highlight some potential consequences of contraception, based on current understanding of elephant biology. These, and any further predictions, need to be incorporated into any government decision-making around contraception, including identifying research needs.](http://www.environment.</a></p></div><div data-bbox=)

One possible side effect of contraception is an increased risk of physical harm to adult elephants. Reproductively active female elephants normally come into oestrous about once every four years. In contrast, contracepted females come into oestrous every three months. Thus, they can attract male attention as much as four times a year. Males (weighing up to 6000 kg) are inclined to chase and mount these females (smaller at 2000–2800 kg) up to 16 times more frequently over the four years. This increases the chances of injury to females. Furthermore, more frequent oestrus of females may lead to increased male–male aggression over mating opportunities, and the number that could be killed during fights.

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Potential social complications may be more diverse. Elephant females live in family groups with other closely related females and their offspring. Males are either solitary, or live in small temporary groups, except when associating with family groups for breeding opportunities. There is close agreement among elephant biologists that the defence and care of youngsters has probably driven the evolution of group formation in females. Furthermore, interactions between females and calves help stabilize relationships, both within and between family groups. Contraception ultimately removes calves from these families, and the cohesion that keeps them together. Families without calves may consequently seek out and join families that have calves, leading to larger female herds and altered social structures.

A second social feature that may be affected is allomothering. Calves receive care from not only their mothers, but from related adolescent, juvenile and even unrelated females as well.<sup>7</sup> By the time they give birth to their first calf, these allomothers generally have up to 10 years' experience helping to raise other elephants' young. Despite this, a large number of calves born to first-time mothers die. Contraception can accentuate this problem by reducing allomothering and learning-opportunities for yet-to-be mothers.

In addition, fewer calves may generate higher levels of tension within family groups. As female herds become larger, calves may experience greater (potentially fatal) harassment from the increasing number of potential allomothers. This would increase stress in mothers, who may spend less time feeding as they try to keep track of their calves. This could affect milk production and ultimately calf survival.



**Heavy responsibility:** contracepted female elephants come into oestrous every three months and so can attract male attention four times a year. This increases the chances of injury to females and may have other undesirable side-effects. [Photograph: Katie Gough]

Behaviourally, the inability of females to give birth may result in a wide range of problems, including depression. In addition, females that have lost calves sometimes kidnap other calves (G. Kerley, unpublished data). Contracepted females could resort to kidnapping due to their inability to have young. This would lead to heightened aggression between females, and increase risks to calves. Furthermore, if a female successfully kidnaps a calf, she may not be able to provide sufficient milk to keep it alive.

The body condition of females emerging from contraception will likely be higher than females with calves, as they will not have recently undergone the stress of reproduction. It is possible that as a result there will be a male bias in the offspring of these females, according to the Trivers-Willard model of sex allocation in offspring of dimorphic species.<sup>8</sup>

Ecologically, contraception could change feeding patterns and space use of non-reproducing females. These females will have lower energetic and nutritional requirements as they are not producing young or milk. Contracepted females could utilize different habitats and be less selective of the quality of food they eat, altering their impacts on ecosystems. In addition, movements of families away from water are limited by how long calves can survive without drinking. Thus, families remain relatively close to water. In contrast, contracepted cows are likely to move further from water, leading to more widespread impacts across the landscape. Furthermore, the larger female herds that have been predicted above may have greater localized effects on vegetation.

As with culling, potential complications brought about by contraception will not appear overnight. It is likely that herds

will be without calves/young elephants approximately 5–10 years after the start of contraception, due to the long generation time of elephants. Problems will consequently emerge only after this period. Any elephant contraception programme should be regarded as an experiment, with the possible consequences that we have raised, being treated as predictions to be tested, as espoused under adaptive management.

South Africa is now leading the way with integrating elephant science into policy and management.<sup>9</sup> This has been specifically achieved through the Minister of Environmental Affairs and Tourism's Elephant Science Round Table.<sup>9</sup> The initiative and processes are therefore in place, in South Africa at least, to incorporate emerging science on elephant contraception and its impacts into elephant management policy. This accords with the commitment contained within the draft Norms and Standards for Elephant Management ([www.environment.gov.za](http://www.environment.gov.za)), to apply adaptive management to improve our understanding and control of elephants. The challenge is therefore to extend this process to other elephant range states' policies, and thereby mitigate some of the controversy and errors that have emerged around elephant culling.

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