

Development and current status of African elephant (*Loxodonta africana*) immunocontraception using the porcine zona pellucida (PZP) vaccine in South Africa

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Elephant populations on smaller fenced game reserves in South Africa grow at 8-10% per annum. Uncontrolled population growth rapidly leads to habitat destruction, break outs and human-elephant conflict situations. Because very little new habitat is available for elephants, the only acceptable solution is to control the rate of reproduction. Immunocontraception of elephants dates back to 1995 when homology between elephant and porcine zona pellucida (PZP) proteins was established using immunohistochemistry. The first contraception trial followed in 1996 in Kruger when 21 cows were primed with PZP and TDCM adjuvant followed by two booster immunisations. One year later 44% and 89% of treated and control cows were pregnant, respectively. A modification of the protocol improved the efficacy and only 2 of 10 cows conceived during the second trial. In 2000 a PZP-immunocontraception program was initiated on Greater Makalali Private Game Reserve. During Year 1 three immunisations with pPZP in Freund's adjuvants were deployed on an individual cow basis (n=18). This was followed by annual boosters. In Year 3 and onwards, no calves were born to treated cows. From 2002 to 2005 another 6 reserves joined the program. Individually identified cows (n=108) were treated with drop-out darts delivered from a helicopter resulting in an efficacy of 100%. During this period the number of treatments was reduced two immunisations in Year 1 with no negative effect on efficacy. Retrospective analyses showed that, on the day of primary vaccination, 62 cows were pregnant. They gave birth to normal healthy calves. Furthermore, contraceptive efficacy was attained soon after the first booster in Year 1. Since 2005 another 18 game reserves have joined the program and currently >750 cows are being treated annually. In 7 of these reserves, with cow populations ranging from 40 to 157, individual identification is not possible and so, blanket treatment is being used. Given the terrain and habitat of the reserves approximately 90-95% of cows are treated during each immunisation round. As most of these reserves have not reached Year 3 of the program, the effect on calving rate cannot be assessed. However, on two reserves the numbers of calves born per annum have been reduced to 1-2 (Tembe Elephant Park) or nil calves (Greater Addo), respectively. It is significant to mention that the cows in Addo were immunised three times during Year 1. PZP-immunocontraception is thus an effective and safe means of population control of elephants in small to medium-sized game reserves.