

6.3 Effects of immunisation against GnRH on fertility of the brushtail possum

Authors: ¹Eckery, Doug C.; ¹Thomson, B.P. & ²Miller, Lowell A.

Institution: ¹National Research Centre for Possum Biocontrol at AgResearch, Wallaceville Animal Research Centre, Upper Hutt, New Zealand; ²Victoria University of Wellington, New Zealand; ³National Wildlife Research Center, USD, USA

Contact: Doug Eckery, Doug.Eckery@vuw.ac.nz

The brushtail possum (*Trichosurus vulpecula*) is an introduced marsupial species that has become New Zealand's number one vertebrate pest, in both ecological and economical terms. Conventional control methods, mainly poisoning and trapping, are not considered to be sustainable in the long term, and thus new methods are being investigated to manage the possum population through fertility control. As in other mammals, we have shown that gonadotrophin releasing hormone (GnRH) is a primary regulator of gonadotrophin secretion and a key hormone for reproduction in possums. Chronic treatment of female possums with a potent GnRH agonist caused a downregulation of gonadotrophin secretion and resulted in infertility. In a preliminary study with castrated male possums, we found that immunisation against GnRH caused a decrease in gonadotrophin secretion demonstrating that GnRH biological activity can be neutralised via the immune system in this species. The aim of this study was to determine the effect of immunisation against GnRH on the fertility of female brushtail possums. Possums were randomly assigned to one of three treatment groups (n=10/group): control (adjuvant only), 1-shot GnRH or 2-shot GnRH. The GnRH vaccine used was GonaCon™ (kindly provided by NWRC, Ft. Collins, CO). Animals were immunised prior to the breeding season and for the control and 2-shot groups, the two immunisations were administered 30 days apart. Blood samples were collected at days -4, 0, 30, 60, 150, 240 and 330 from the first injection to monitor antibody titres. Reproductive cycles and the birth of offspring were monitored throughout the breeding season. In both GnRH immunisation groups, antibody titres against GnRH and KLH reached peak levels at 60 days. In the 1-shot group, antibody titres to GnRH decreased more rapidly than in the 2-shot group, whereas antibody titres to KLH were similar between the two groups. The proportions of animals that produced offspring were 8/10, 1/10 and 0/10 and the total numbers of offspring produced were 29, 1 and 0 for the control, 1-shot and 2-shot groups, respectively. The duration of effect is currently being monitored. In conclusion, immunisation of female possums against GnRH is very effective at reducing fertility. Results from this study will, in part, serve as a standard for defining optimal responses to immunisation against fertility reagents and contribute to the development of a transmissible form of fertility control for possums in New Zealand.