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**Faecal steroid measurements for the assessment  
of reproductive function in Japanese quail  
(*Coturnix coturnix japonica*) and kakapo (*Strigops  
habroptilus*).**

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## Abstract

The kakapo (*Strigops habroptilus*) is an endangered parrot endemic to New Zealand and little is known of its reproductive physiology. Reproductive function is conventionally determined by the measurement of reproductive steroids in plasma samples. This is impractical and invasive in endangered, free-living species. However, the measurement of reproductive steroids in avian faecal samples is practiced. Few studies have documented strong relationships between faecal and plasma steroid concentrations. The objectives of this study were to develop and validate a faecal extraction method for the measurement of oestradiol, progesterone and testosterone in Japanese quail (*Coturnix coturnix japonica*); determine the relationships between steroid concentrations and gonadal development in quail; and define annual faecal hormone cycles of kakapo in relation to their breeding status.

Groups of male and female quail were held on different photoperiodic and temperature regimes to produce birds with a range of gonad sizes and steroid concentrations. Steroid concentrations were measured in faeces and plasma by radioimmunoassay. Positive relationships were demonstrated between plasma and faecal steroid concentrations. Faecal steroid concentrations had strong positive relationships with ovary and testis size in female and male quail respectively.

The extraction method developed was then applied to faecal samples, which were collected from kakapo in their free-living environment on Whenua Hou (Codfish Island). The samples were collected from identified birds over three potential breeding seasons. There were annual cycles of hormone concentrations that corresponded with cycles of breeding activity in females and males. No significant differences were found between breeding and non-breeding years for faecal concentrations of all three hormones, suggesting that kakapo undergo a degree of gonadal development each year. Annual hormone profiles for individual birds supported this finding.

This study quantifies the value of collecting multiple faecal samples in both captive and wild situations and demonstrates the power and value of faecal steroid analysis.



*Author with Sirocco, photo: R.Cole.*

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