OLFACTORY COMMUNICATION IN THE FERRET (*MUSTELA FURO* L.) AND ITS APPLICATION IN WILDLIFE MANAGEMENT

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ABSTRACT

Olfactory communication in the ferret (Mustela furo L.) and the use of ferret anal gland odours in wildlife management were investigated. Four hypothesised functions of ferret odours and predictions from these hypotheses were outlined and tested.

Predictions of spatial and temporal patterns of scent marking were tested by two years of observations on ferrets in an outside enclosure. A repertoire of scent marking actions was described. Both males and females performed anal drags after defaecation at conspicuous latrines throughout the year. Wiping, belly crawl and/or body rubbing, and chin rubbing, were performed more often by males, and peaked in spring. Chin rubbing was associated with food sites, and body rubbing with agonistic encounters. An experiment testing the use of anal gland odours in the maintenance of spatiotemporal separation of males was inconclusive.

An histological study of the skin revealed abdominal glands in both sexes around the urogenital opening, larger in males than in females. The odour-producing characteristics of these glands are discussed. Tubular and sebaceous glands were present over the whole body, and both atrichial and epitrichial tubular glands occurred in the feet and digits.

Gas chromatography on ten individual ferrets' anal sac extracts revealed sexually and individually distinct profiles of volatile compounds, but no consistent seasonal trends. Females had higher concentrations of 2,3-dimethylthietane and/or 3,4-dimethyl-1,2-dithiolane, while indole was usually the largest peak in male GC profiles. 2-propylthietane was an important constituent in most individuals of each sex.

Y- and T-maze preference tests showed that ferrets were attracted to ferret anal gland odour; could discriminate ferret odour from that of weasel, male from female, familiar from strange, familiar from their own, and fresh from one-day old ferret anal gland odours. Males preferred to investigate female odours, but could not discriminate

between oestrous and anoestrous odours.

Male ferrets' behaviour in the presence of various anal gland odours and an opponent showed them to be more confident in the presence of their own rather than their opponent's odour, and less confident with their opponent's than with a known dominant animal's odour.

With mustelids' predatory role in New Zealand and current predator control techniques in mind, the feasibility of using ferret anal gland odours as scent lures was investigated. A bioassay of synthetic anal gland compounds showed that the most attractive combination of compounds was trans- and cis-2,3-dimethylthietane and 2-propylthietane, which was used as the basis of an artificial scent lure in trapping experiments. Paired-trap design choice experiments showed that ferrets preferred to enter baited traps rather than those scented with the artificial lure; showed no preference between bait and a natural product anal gland odour lure; preferred the natural over the artificial lure; and the artificial lure over no odour. The removal of 2,3-dimethylthietane did not reduce the attractiveness of the artificial lure, and a lure containing only indole was also as attractive as the artificial lure. Comparisons between trap sites with bait/lure pairs and those with lure only indicated that scent lures should be as effective as bait in attracting ferrets, and this was confirmed in a field programme. Differences in the catches of males and females, through the year, and on fresh and stale lure were analysed, along with data on captures of non-target species.

Evidence for the hypothesised functions of odours is synthesised. The role of anal gland odour in providing an olfactory association between a resident and the defended area is supported, along with a scent matching mechanism, while a neighbour-neighbour avoidance mechanism cannot be rejected. Anal gland odour's role in sex attraction finds support, as does the antipredator defence hypothesis. Body odours are thought to play a more active role than anal gland odour in agonistic encounters, and chin rubbing could provide a bookkeeping system for efficient food searching. Ferret and other mustelid olfactory communication systems play similar roles in mediating spacing systems. Differences occur in the roles of odours as sex attractants where there are differences between species in social organisation or reproductive

physiology.

Results of the bioassay and trapping experiments are discussed in the context of the pheromone concept which is rejected for ferrets. Scent lures are seen as valuable additions to the current techniques used in mustelid control operations. The major priorities for future research are the confirmation of the presence of odorous secretions at scent marking sites; the study of latrine usage by wild ferrets; the development of the artificial lure in a long-lasting form; and the testing of the attractiveness of artificial and natural product lures to other mustelid species.

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