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It is the paper published as:

Author(s): Freire, R. ; Talbot, S.B. ; Wassens, S.M.

Title: Effect of captivity and management on behaviour of the domestic ferret (*Mustela putorius furo*)

Journal: Applied Animal Behaviour Science

ISSN: 0168-1591

Year: 2014

Pages: 94 - 101

Volume: 151

Issue:

URLs:

FT: <http://dx.doi.org/10.1016/j.applanim.2013.11.017>

PL: http://primo.unilinc.edu.au/primo_library/libweb/action/dlDisplay.do?vid=CSU2&docId=dtl_csu58984

Accepted Manuscript

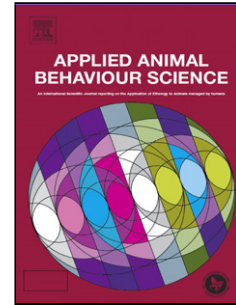
Title: Effect of captivity and management on behaviour of the domestic ferret (*Mustela Putorius Furo*)

Author: Talbot Sarah Freire Rafael Wassens Skye

PII: S0168-1591(13)00289-X
DOI: <http://dx.doi.org/doi:10.1016/j.applanim.2013.11.017>
Reference: APPLAN 3831

To appear in: *APPLAN*

Received date: 22-4-2013
Revised date: 27-11-2013
Accepted date: 29-11-2013



Please cite this article as: Effect of captivity and management on behaviour of the domestic ferret (*Mustela Putorius Furo*), *Applied Animal Behaviour Science* (2013), <http://dx.doi.org/10.1016/j.applanim.2013.11.017>

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1 **Effect of captivity and management on behaviour of the domestic ferret (*Mustela Putorius Furo*)**

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4 Talbot, Sarah^{a*}, Freire, Rafael^a, Wassens, Skye^b

5

6

7 ^a School of Animal and Veterinary Sciences, Charles Sturt University, LMB 588, Wagga Wagga, NSW, 2678,

8 Australia

9

10 ^b Institute of Land Water and Society, School of Environmental Sciences, Charles Sturt University, LMB 588,

11 Wagga Wagga, NSW, 2678, Australia

12

13

14

15 *Correspondence to:

16 Sarah Talbot

17 School of Animal and Veterinary Sciences

18 Charles Sturt University

19 LMB 588, Wagga Wagga, NSW, 2678, Australia

20 Email: stalbot@csu.edu.au

21

22 Word count: 4854

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32 **Abstract**

33 The domestic ferret (*Mustela putorius furo*) is becoming an increasingly popular companion animal in Australia
34 and overseas yet very little is currently known about the effects of different management factors (such as
35 housing and enrichment) on domestic ferret behaviour and welfare. Hence, the aims of this study were to
36 investigate the relationship between housing and management and the incidence of play and undesirable
37 behaviours in order to ultimately improve welfare in the domestic ferret. An online survey was constructed
38 which focused on different housing and management strategies utilised by ferret owners and required owners to
39 score the frequency of a range of behaviours observed. Ferret owners were also able to report what behavioural
40 aspects they believed particular ferret behaviours were associated with. There were 466 ferret owners who
41 participated in this survey study. Generalised linear mixed models (GLMMs) were used to identify significant
42 relationships between sex, de-sexing, housing, enrichment, and the frequency of behaviours reported by owners.
43 It was found that the overall frequency of undesirable behaviours, on a scale of 0 (never) to 4 (always), was
44 quite low, with ferret owners reporting that these behaviours 'rarely' to 'never' occurred (mean score (MS) =
45 0.73). In contrast, the frequency of overall play behaviours was reported as 'frequently' to 'occasionally' (MS =
46 2.35). It was also found that male ferrets showed more play behaviour (weasel war dance) than females (male
47 MS = 2.66; female MS = 2.61; $P = 0.04$) and that de-sexed ferrets had a lower incidence of repetitive behaviour
48 compared to entire ferrets (de-sexed MS = 0.54; entire MS = 0.79; $P = 0.01$). Ferrets provided with a higher
49 level of enrichment demonstrated a higher occurrence of play behaviour such as dooking (MS for less than two
50 enrichment items = 1.47; MS for three to five enrichment items = 1.96; MS for more than six enrichment items
51 = 2.18; $P = 0.01$) and weasel war dance (MS for less than two enrichment items = 2.34; MS for three to five
52 enrichment items = 2.59; MS for more than six enrichment items = 2.70; $P < 0.01$). There was also a significant
53 interaction between number of hours ferrets spent confined and number of enrichment items (GLMM, $F_{4,329} =$
54 10.2, $P = 0.03$) on the incidence of bite-hurt (an undesirable behaviour) suggesting that generally, higher levels
55 of enrichment in conjunction with less hours spent confined results in less bite-hurt behaviour. Surprisingly, size
56 of enclosure had no significant effect on any behaviour (all $P > 0.1$). Although ferrets display a higher
57 incidence of play behaviour than undesirable behaviour, which may be seen as a positive sign, factors such as
58 the level of enrichment provided, amount of time ferrets are confined and de-sexing should be carefully
59 considered when implementing management plans for this companion animal as they exert an influence on
60 ferret behaviour.

61 **Key words:** domestic ferrets; behaviour; housing; enrichment; stereotypies.

62 1. Introduction

63

64 The domestic ferret (*Mustela putorius furo*) is a small mustelid considered to be the same species as the
65 European polecat (Plant and Lloyd, 2010) and was domesticated between 2000-3000 years ago (Church, 2007;
66 Plant and Lloyd, 2010). Since about the 1970's, the domestic ferret has become increasingly popular as a
67 companion animal across Europe, the United States of America and more recently, Australia (Ball, 2006).
68 Ferrets are described as highly intelligent, agile, playful, lively, curious, and highly inquisitive with a natural
69 instinct to explore (Vinke and Schoemaker, 2012). As with other mustelids, the welfare of domestic ferrets can
70 be compromised if their housing, enrichment, socialisation and handling, diet and health care, is inadequate
71 (Forbes et al., 2007). Therefore, housing of ferrets needs to have an adequate degree of complexity and
72 environmental stimulation to cater for their inquisitiveness and intelligence (Plant and Lloyd, 2010). The
73 provision of various enrichment items which easily elicit play behaviour is recommended (Vinke and
74 Schoemaker, 2012). On the whole however, little is known about the effects of different housing conditions on
75 ferret behaviour and welfare but the European Commission (2007) recommends that ferrets should be provided
76 with a confinement size of 4500cm²-6000cm², minimum floor space of 1500cm²-6000cm², and a height of at
77 least 50cm, depending on the size and sex of the ferret.

78 The domestic ferret exhibits very similar play behaviours to the European polecat, which has been reported
79 to consist of a frenzied dance of sideways jumps (weasel war dance) performed in conjunction (but not always)
80 with chuckling vocalisations (dooking), as well as play chasing, wrestling, and pouncing (Poole, 1970; Fisher,
81 2006; Plant and Lloyd, 2010). Play behaviour can be used as a positive welfare indicator as it does not typically
82 occur in animals under stress (Hinton and Dunn, 1967; Müller-Schwarze et al., 1982; McCune, 1992; Thornton
83 and Waterman-Pearson, 2002). Play is usually associated with a relaxed environment (Fage, 1981; Grier and
84 Burk, 1992; Broom and Johnson, 1993) when other primary behavioural needs are being met (Boissy et al.,
85 2007). Absence of play behaviour in ferrets may indicate reduced welfare and be due to illness, pain, stress or
86 unfulfilled needs (Vinke and Schoemaker, 2012).

87 Companion animals perform certain behaviours which their human owners can perceive as undesirable, for
88 instance, aggression towards human handlers and other animals or repetitive behaviours which may be
89 considered destructive (Wells and Hepper, 2000). Therefore, these types of behaviours have been labelled
90 'undesirable' throughout this study. There is a common misconception that domestic ferrets are highly
91 aggressive, even vicious (Schilling, 2007). Ferrets may play roughly with each other, but like any other

92 companion animal, they can be friendly and affectionate towards humans if handled and socialised frequently
93 and from a young age (Ball, 2006). It is a common understanding amongst ferret owners that if they are not
94 handled regularly ferrets are likely to bite, which may result in extensive periods of confinement, euthanasia, or
95 abandonment.

96 Little is known about the repetitive behaviour (such as stereotypies) displayed by the domestic ferret, but
97 there have been numerous studies conducted on mink. Common repetitive behaviour observed in mink under
98 farming conditions includes pacing along the wall of the cage and repetitive intensive scratching at the cage wire
99 mesh with the front paws (Heller, 1991; Hansen, 1993; Mason, 1993). These behaviours may be considered as
100 indicative of frustration (Mason, 1991). Various studies have supported the notion that the incidence of
101 stereotypies and stress levels are reduced if more environmental enrichment is provided (Hansen, 1989; Mason
102 et al., 2001; Poessel et al., 2011). Although most of these studies have been conducted in mink, it is assumed
103 that this would also be the case for domestic ferrets due to these species being closely related.

104 The main aims of this study were to determine the incidence of play and undesirable ferret behaviour and to
105 investigate the management factors associated with these behaviours. The frequencies of various behaviours
106 considered undesirable or play for a large sample of ferrets was scored on a scale of 0 (never) to 4 (always) by
107 owners. In addition, owner opinions were sought on the motivation underlying the various behaviours. A survey
108 was designed to 1) describe ferret behaviour, 2) describe housing and enrichment practices used by ferret
109 owners, and 3) investigate owner opinions.

110

111 **2. Methods**

112

113 *2.1 Participant recruitment*

114

115 To recruit participants, 62 veterinary clinics across Australia that were known to treat ferrets (listed on
116 websites of Australian ferret societies) were utilised for advertising the online survey. This was achieved by
117 asking each business to place a poster advertising the details of the survey, in their practice. The survey was also
118 advertised using social media, that is, the advertisement was placed on six ferret welfare societies and group
119 web pages and shared amongst ferret owners. The advertisement provided brief details for potential participants
120 and provided the internet link for participants to complete the survey. The survey was made available for
121 completion for approximately 8 weeks from May to July 2012.

122 2.2 Survey design

123

124 The survey consisted of 60 questions which were a combination of simple yes or no, multi-item, scale, and
125 open-ended questions (Groves et al., 2009). The overall survey was divided into six sections focusing on
126 different management or behavioural components. Section A was designed to obtain demographic information
127 of participants such as their location, and number of ferrets owned. Section B gathered information on the
128 housing and enrichment provided to ferrets, i.e. size and type of confinement, whether small (2m² or less),
129 medium (3-5m²) or large (6m² or more), and how many enrichment items that were provided. Enrichment items
130 included objects such as balls, squeaky toys, bells, scratching posts, substrate boxes, soft toys, old clothes,
131 ropes, and cardboard boxes. Sections C and D queried about diet and health care given to ferrets. Section E
132 enquired about ferret background (i.e. sex and if de-sexed). Section F comprised a list of play and undesirable
133 behaviours with brief descriptions and respondents were asked to report on a 5-point scale (4 = always, 3 =
134 frequently, 2 = occasionally, 1 = rarely, and 0 = never) the frequency with which they observed each of these
135 behaviours to occur, in each of their ferrets, within the fortnight preceding the completion of the survey (see
136 Table 1 for a description for each of these behaviours). Participants were also asked to select from a list
137 provided, the motivations or function with which they believed these behaviours to be associated. The list was
138 developed in consultation with ferret owners and included aggression, fear, play, social interaction, escape
139 behaviour, exploration, and abnormal behaviour. We also included a 'none of these' categories in order to
140 accommodate differing opinions from owners. Multiple motivations/functions could be selected for each
141 behaviour, making it possible for each to contain numbers of respondents exceeding the total who actually
142 participated in the survey. Pretesting was conducted using three known ferret owners prior to making the survey
143 available for completion online.

144

145 2.3 Statistical analysis

146

147 Owner-reported frequency of occurrence of the several behavioural elements under investigation was on an
148 ordinal scale, with some owners reporting on the behaviour of multiple ferrets, and was analysed in a repeated-
149 measures ordinal logistic regression model. We performed the repeated-measures tests using a Generalised
150 Linear Mixed Model in SPSS for windows (version 20). Ferret owner was used as the random effect to account
151 for owners reporting on multiple ferrets. Main effects of sex, de-sexing, size of enclosure, hours spent confined
152 and number of enrichment items were included in the model. Interaction effects of sex/de-sexed status, hours

153 spent confined/size of enclosure, hours spent confined/number of enrichment items and number of enrichment
154 items/size of enclosure were also included in the model. A test of parallel lines was undertaken for each
155 behavioural variable to test the null hypothesis that the odds for each explanatory variable are consistent across
156 different thresholds of outcome variable.

157

158 3. Results

159

160 3.1 Descriptive findings

161

162 A total of 466 questionnaires were returned which described 1649 ferrets. Participants were drawn from
163 Australia (46.6%) as well as overseas (53.4%). It was common to own more than one ferret (86.0%) with a
164 maximum of six ferrets. A large number of respondents reported owning ferrets for 6 or more years (41.4%).
165 Almost half the ferrets were acquired through a formal rescue such as being adopted through a ferret welfare
166 organisation (44.7%), whilst a large part of the remaining ferrets (42.2%) were acquired commercially (i.e.
167 through a pet shop or breeder). Adding to ferret collections was reasonably common with at least one new ferret
168 acquired in the last 6 months by 42.0% of participants. Out of the entire sample there were slightly more male
169 ferrets (54.7%) than female ferrets (45.3%) and the majority of all ferrets were de-sexed (80.2%). Few ferrets
170 (11.1%) were unconfined; however, more than two-thirds were allowed to roam for at least a couple of hours
171 per day. Most ferrets were also given a variety of enrichment items (Table 2).

172 Many ferrets were assessed by their owners as 'rarely' to 'never' exhibiting behaviours that they perceived
173 as undesirable (mean score (MS) = 0.73). Of the undesirable behaviours reported, the most common was
174 scratching compulsively (Table 3). Play behaviours were more commonly reported by ferret owners than
175 undesirable behaviours, with the overall MS indicating that play occurs 'frequently' to 'occasionally' (MS =
176 2.35). The most common play behaviour reported was weasel war dancing (Table 3).

177

178 3.2 Sex differences in behaviour and effect of de-sexing

179

180 Male ferrets showed slightly more weasel war dance than female ferrets (GLMM, $F_{1,329} = 4.3$, $P = 0.04$; Fig.
181 1a). No significant differences were observed between males and females for bite-drag (GLMM, $F_{1,329} = 0.2$, $P =$
182 0.65), bite-hurt (GLMM, $F_{1,329} = 1.6$, $P = 0.21$), dooking (GLMM, $F_{1,329} = 0.4$, $P = 0.54$), compulsive scratching

183 (GLMM, $F_{1,329} = 1.5$, $P = 0.22$) or repetitive behaviour (GLMM, $F_{1,329} = 1.3$, $P = 0.25$). De-sexing significantly
184 reduced the incidence of repetitive behaviour (GLMM, $F_{1,329} = 6.2$, $P = 0.01$; Fig. 1b), but de-sexing had no
185 significant effect on bite-drag (GLMM, $F_{1,329} = 0.2$, $P = 0.63$), bite-hurt (GLMM, $F_{1,329} = 2.6$, $P = 0.11$),
186 dooking (GLMM, $F_{1,329} = 1.9$, $P = 0.17$), compulsive scratching (GLMM, $F_{1,329} = 1.1$, $P = 0.30$) or weasel war
187 dance (GLMM, $F_{1,329} = 0$, $P = 1.00$). No significant interactions were found between sex and de-sexed status
188 (all $P > 0.10$).

189

190 3.3 Effect of management on behaviour

191

192 Providing more enrichment items increased the incidence of play behaviour: dooking (GLMM, $F_{2,329} = 8.3$,
193 $P = 0.01$; Fig. 2a) and weasel war dance (GLMM, $F_{2,329} = 10.0$, $P < 0.01$; Fig. 2b). Of the undesirable
194 behaviours, only bite-hurt appeared to be influenced by the number of enrichment items (GLMM, $F_{2,329} = 6.4$, P
195 $= 0.04$). However, a significant interaction between number of hours in confinement and number of enrichment
196 items (GLMM, $F_{4,329} = 10.2$, $P = 0.03$) suggests that although the number of enrichment items reduced the
197 incidence of bite-hurt when confined for long or short periods of time, ferrets showed less bite-hurt with fewer
198 enrichment items when confined between 19 and 21h (Fig. 3). The number of enrichment items had no
199 significant effect on bite-drag (GLMM, $F_{2,329} = 4.2$, $P = 0.12$), compulsive scratching (GLMM, $F_{2,329} = 2.7$, $P =$
200 0.27) or repetitive behaviour (GLMM, $F_{2,329} = 2.3$, $P = 0.30$). Similarly, the number of hours spent confined had
201 no significant effect on weasel war dance (GLMM, $F_{2,329} = 4.3$, $P = 0.12$), dooking (GLMM, $F_{2,329} = 0.4$, $P =$
202 0.83), bite-drag (GLMM, $F_{2,329} = 0.1$, $P = 0.97$), compulsive scratching (GLMM, $F_{2,329} = 4.0$, $P = 0.13$) or
203 repetitive behaviour (GLMM, $F_{2,329} = 2.4$, $P = 0.30$).

204 Surprisingly, size of enclosure had no significant effect on bite-drag (GLMM, $F_{2,329} = 2.0$, $P = 0.40$), bite-
205 hurt (GLMM, $F_{2,329} = 0.06$, $P = 0.90$), dooking (GLMM, $F_{2,329} = 1.8$, $P = 0.42$), weasel war dance (GLMM,
206 $F_{2,329} = 0.3$, $P = 0.90$), compulsive scratching (GLMM, $F_{2,329} = 2.8$, $P = 0.25$) or repetitive behaviour (GLMM,
207 $F_{2,329} = 3.9$, $P = 0.10$). No significant interactions were found between the number of enrichment items, number
208 of hours spent confined and size of enclosure (all $P > 0.1$).

209

210 3.4 Owner opinions on the function/motivation associated with ferret behaviour

211

212 Participants generally agreed that bite-drag could be associated with play (51.9%) or social interaction
213 (36.1%) (Table 4). Several respondents also reported that they believed this behaviour to be associated with

214 aggression (36.7%) and fear (22.5%). Likewise for bite-hurt, participants associated this behaviour with play
215 (33.0%), social interaction (16.5%), aggression (46.8%) and fear (45.9%). Many respondents placed compulsive
216 scratching in the abnormal behaviour category (40.8%) or associated it with escape behaviour (33.5%).
217 Conversely, others believed it to be associated with exploring (26.0%). Numerous respondents associated
218 repetitive behaviours (i.e. pacing) with the broad category of abnormal behaviour (54.5%) or escape behaviour
219 (27.0%). There was general agreement amongst participants for the play behavioural associations. Many
220 participants believed dooking to be associated with play (82.8%) or social interaction (56.9%) and weasel war
221 dancing to be associated with social interaction (79.0%) or exploring (22.7%).

222

223 4. Discussion

224

225

226 In summary, the overall incidence of play behaviour ($MS = 2.35$) was reported to be higher in ferrets than
227 the undesirable behaviours ($MS = 0.73$). Although males were observed to perform a higher occurrence of
228 weasel war dancing than females, there was otherwise generally little difference in behaviour between sexes.
229 De-sexing was found to reduce the incidence of repetitive behaviour in both sexes. More play behaviour
230 (dooking and weasel war dance) was observed in ferrets provided with more enrichment items. Although the
231 number of enrichment items reduced the incidence of bite-hurt when confined for long or short periods of time,
232 ferrets showed less bite-hurt with fewer enrichment items when confined for between 19 and 21h. Surprisingly,
233 size of enclosure had no significant effect on any of the behaviours studied. Finally, participants generally
234 agreed upon what each of the behaviours was associated with, but also acknowledged that these behaviours were
235 not associated with a single behavioural aspect, but rather multiple factors.

236 The overall MS 's for undesirable behaviours were uniformly low and since the lowest point on the scale was
237 labelled 'never' and the midpoint was labelled 'occasionally', the ferrets surveyed 'rarely' to 'never' performed
238 many of the undesirable behaviours investigated in this study. Conversely, the overall MS 's for play behaviours
239 were higher than for the undesirable behaviours, with the average score indicating ferret owners in this study
240 observed these play behaviours 'frequently' to 'occasionally'. If we regard play behaviours as indicative of a
241 positive state, then combined these results suggest that domestic ferrets generally adapt well to captivity, though
242 it should be noted that overall prevalence of behaviour tells us little about how important even small displays of
243 play or undesirable behaviours are to ferrets.

244 The occurrence of behaviours studied did not differ between sexes, except for the incidence of weasel war
245 dance behaviour being higher in males. This is not surprising considering that males have been shown to play

246 more than females in another species, the rat (Thor and Holloway, 1986; Hole, 1988; Pellis and Pellis, 1990). In
247 rats it has been shown that males tend to display and receive more play-soliciting behaviour compared to
248 females (Thor and Holloway, 1986; Hole, 1988). Additionally, males are less likely to withdraw from play
249 initiation and once involved in play, are also less likely to withdraw than females (Meaney and Stewart, 1981).

250 De-sexing was commonly undertaken and this procedure may have been responsible for the lower levels of
251 repetitive behaviour observed in de-sexed ferrets. One possible mechanism to explain this is that, like dogs, de-
252 sexed ferrets may be less motivated to roam and find mates and so may not have as strong an underlying
253 motivation for locomotion as intact ferrets. It should therefore be remembered that de-sexing cannot only be a
254 useful management tool in controlling pregnancies but also as a means to reduce repetitive behaviour patterns,
255 as the above finding suggests. However, as word of caution, recent studies suggest that surgically de-sexing
256 ferrets can be associated with an increased risk of developing hyperadrenocorticism (hyperfunctioning of the
257 adrenal cortex due to neoplastic changes) and chemical sterilisation using a slow releasing GnRH agonist
258 deslorelin implant is therefore recommended (Vinke et al., 2008).

259 The increase in the incidence of play behaviours with a greater number of enrichment was expected as the
260 enrichment items that we enquired about were all expected to elicit play. This increase most probably reflects
261 the interaction of the ferrets with the objects (including biting and dragging the items around) rather than with
262 people or other ferrets. This may also explain why the number of enrichment items had no effect on bite-drag,
263 which was supported by 51.9% of survey participants who associated bite-drag with play. Providing six or more
264 enrichment items probably increases arousal, which may not only be expressed as play behaviour, but may be
265 channelled into undesirable behaviours as well (such as bite-drag). This trend is somewhat in agreement with the
266 findings of Dallaire et al. (2012) where mink that were initially inactive and displayed low levels of locomotor
267 stereotypic behaviour in non-enriched housing, became more aroused and active when provided with
268 enrichment items.

269 Ferrets have quite a complex behavioural repertoire and it is clear that owners considered that there were
270 different underlying motivations and causes of different behaviours. Although for each behaviour there was
271 usually a large amount of participants who selected one key aspect with which that behaviour was probably
272 associated, many respondents stated that these behaviours can be associated with a number of factors. For
273 instance, certain behaviours that owners consider as being undesirable, such as biting, were also associated with
274 play or aggression depending on the context in which it was exhibited. Curiously, only about half of owners
275 considered that repetitive behaviour or compulsive scratching were associated with the abnormal behaviour

276 category. Human perception of farm animal behaviour may be relatively accurate (Wemelsfelder et al., 2000;
277 Wemelsfelder and Lawrence, 2001; Wemelsfelder, 2007) however, this is not necessarily true for companion
278 animals. Exploring owners' perceptions has raised the interesting question that apparently similar behaviours in
279 ferrets may have different underlying motivations.

280 Although this study yielded some interesting results, there are certain limitations of this study that must be
281 taken into consideration. One issue was that many participants were sourced from ferrets clubs and societies.
282 Ferrets belonging to these people are possibly well cared for, due to information, advice and knowledge on the
283 appropriate care of ferrets as well as their behaviour, being easily accessible for club members. Further, only
284 dedicated ferret owners were expected to take the time to complete a survey that may have taken approx. 45
285 minutes to complete, depending on the number of ferrets owned. As with many survey studies of this type, we
286 cannot exclude the possibility that our sample was not representative of the whole ferret companion animal
287 population.

288

289 **5. Conclusions**

290 This study has revealed key information about how ferrets are currently managed and the incidence of play
291 and undesirable behaviour. Within the population of ferrets surveyed, play behaviours were described as
292 occurring 'frequently' to 'occasionally', whereas undesirable ones were described as occurring 'rarely' to
293 'never'. Although management factors relating to housing and enrichment were found to influence ferret
294 behaviour, it only appears to do so up to a certain point. Nonetheless, the information revealed in this study
295 could potentially be used as a welfare indicator and to assist in formulating appropriate guidelines and
296 implementing management plans for domestic ferrets.

297

298 **Acknowledgements**

299

300 The ferret welfare societies and groups throughout Australia and overseas assisted greatly with participant
301 recruitment. Charles Sturt University provided the funding required for this study. Ethics approval was granted
302 by Charles Sturt University Ethics in Human Research Committee (416/2012/04).

303

304

305

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388

389 **Figure captions:**

390

391 Fig. 1. Error plots showing the frequency of (a) weasel war dance behaviour according to de-sexed status and
 392 sex and (b) repetitive behaviour according to de-sexed status (scores range from 0 = never to 4 = always).

393

394 Fig. 2. Error plots showing the frequency according to number of enrichment items provided for (a) dooking and
 395 (b) weasel war dance (scores range from 0 = never to 4 = always).

396

397 Fig. 3. Error plot showing the frequency of bite-hurt behaviour according to number of enrichment items
 398 provided and number of hours confined (scores range from 0 = never to 4 = always).

Table 1.

Definitions of undesirable and play behaviours as described by Hansen, 1993; Schilling, 2007; Vinke et al., 2008; Vinke and Schoemaker, 2012; and Meagher et al., 2013.

Behaviours	Definition
<i>Undesirable behaviours:</i>	
Bite-drag	Biting and dragging, whether attempting to drag the human handler or dragging other animals around.
Bite-hurt	Biting that hurts whether towards human handler or biting that appears to hurt another animal and may result in injury to the handler or other ferrets.
Compulsive scratching	Persistently scratching at something such as a door.
Repetitive behaviours	Any unvarying, repetitive behaviour such as pacing.
<i>Play behaviours:</i>	
Dooking	A distinct chuckling vocalisation.
Weasel war dancing	Galloping and jumping from side to side, often with mouth open and in conjunction with dooking.

Table 2.
Statistics pertaining to reports by respondents on the types of housing and enrichment they provide to their ferret(s)

	Number of respondents	Percentage
Size of confinement:		
<2m ²	74	15.9
3-5m ²	121	26.0
>6m ²	169	36.3
Hours spent confined:		
<18	128	27.5
19-21	182	39.1
>22	127	27.3
Number of enrichment items provided:		
<2	33	7.1
3-5	161	34.5
>6	245	52.6

Table 3.

Statistics pertaining to the frequencies of undesirable and play behaviours observed in ferrets as reported by owners (scores range from 0 = never to 4 = always).

Behaviours	Mean score	SE of mean	Median	IQR	Position of median on five point scale
<i>Undesirable behaviours:</i>					
Bite-hurt	0.56	0.02	0.00	1.00	'Never'
Repetitive behaviours	0.58	0.03	0.00	1.00	'Never'
Bite-drag	0.84	0.03	1.00	2.00	'Rarely'
Compulsive scratching	0.94	0.03	1.00	2.00	'Rarely'
<i>Play behaviours:</i>					
Dooking	2.06	0.03	2.00	2.00	'Occasionally'
Weasel war dancing	2.64	0.02	3.00	1.00	'Frequently'

Table 4.

The number (and percentage) of respondents that associated each behaviour with particular motivations/functions (note that some associations exceed the 466 participants which completed the survey because some respondents selected more than one motivation/function to explain ferret behaviour).

	Aggression	Fear	Play	Social interaction	Escape behaviour	Exploring	Abnormal behaviour	None of these
Bite-drag	171 (36.7%)	105 (22.5%)	242 (51.9%)	168 (36.1%)	12 (2.6%)	73 (15.7%)	15 (3.2%)	16 (3.4%)
Bite-hurt	218 (46.8%)	214 (45.9%)	154 (33.0%)	77 (16.5%)	26 (5.6%)	45 (9.7%)	20 (4.3%)	16 (3.4%)
Repetitive behaviours	32 (6.9%)	47 (10.1%)	64 (13.7%)	31 (6.7%)	126 (27.0%)	41 (8.8%)	254 (54.5%)	33 (7.1%)
Scratching compulsively	11 (2.4%)	18 (3.9%)	62 (13.3%)	20 (4.3%)	156 (33.5%)	121 (26.0%)	190 (40.8%)	25 (5.4%)
Dooking	8 (1.7%)	4 (0.9%)	386 (82.8%)	265 (56.9%)	5 (1.1%)	89 (19.1%)	7 (1.5%)	1 (0.2%)
Weasel war dance	1 (0.2%)	0 (0.0%)	55 (11.8%)	368 (79.0%)	4 (0.9%)	106 (22.7%)	10 (2.1%)	7 (1.5%)

Figure 1.

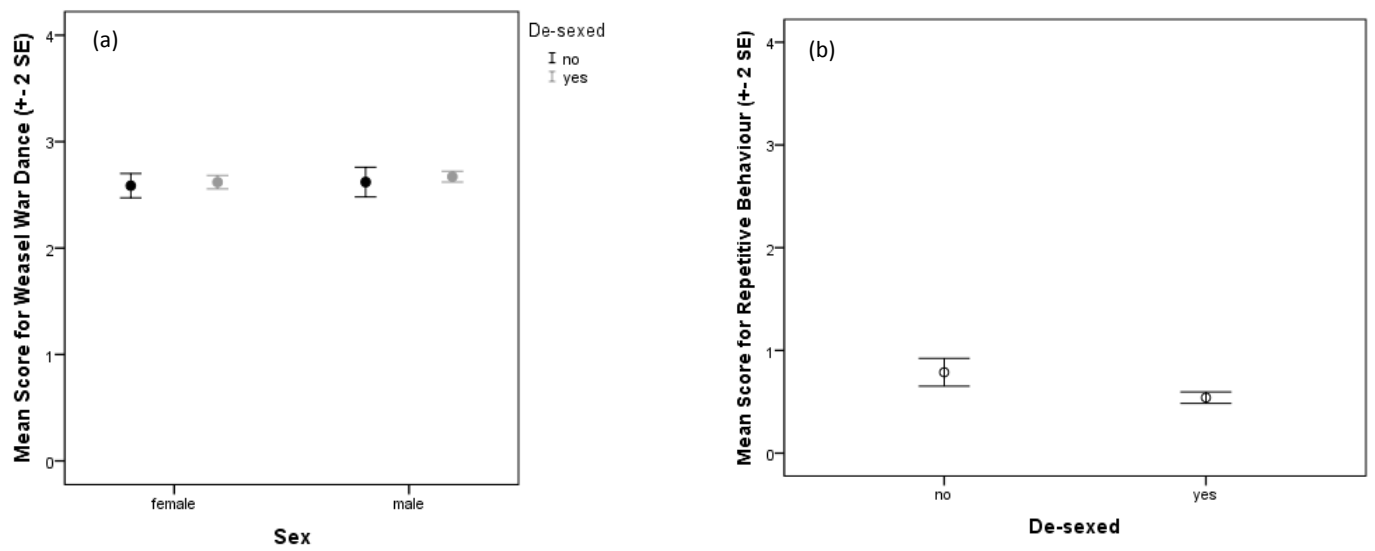


Figure 2.

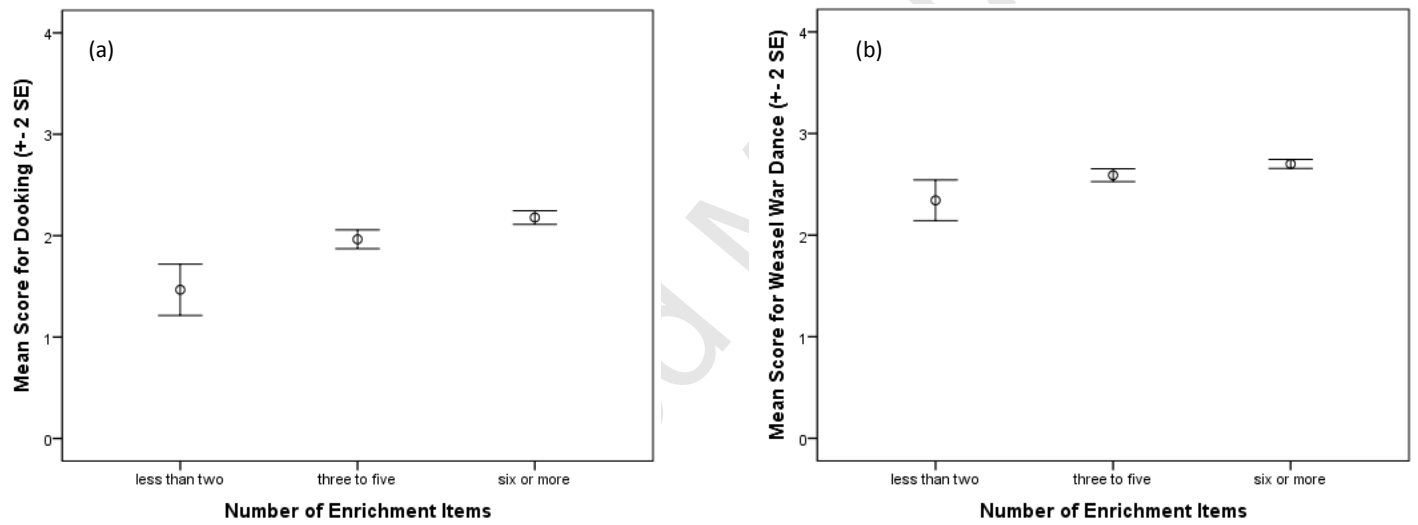


Figure 3.

