

Pilot study to identify risk factors for coprophagic behaviour in dogs

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Introduction

According to several training centres of guide dogs and social dogs in the Netherlands their trainee dogs seem to be prone to develop coprophagic behaviour. Trainee dogs are even expelled from the training programme, especially if a dog shows coprophagia together with other forms of unwanted behaviour. Also working guide dogs and social dogs are no longer suitable for use if they show this problem behaviour and have to be replaced by another trained dog. So these rejections of dogs because of coprophagic behaviour can be considered as economic “losses” to training centres for guide and social dogs.

Consumption of faeces or coprophagia is widespread among animals. In dogs we distinguish two main types: dogs eating dog stool (intraspecific coprophagia) or dogs eating stool of other animals like cats, rabbits, ungulates and humans (interspecific coprophagia). Furthermore in the dogs eating dog stool two types can be distinguished: dogs that ingest their own faeces (autocoprophagia) and dogs that ingest faeces of other dogs (allocoprophagia). Whereas it is natural behaviour that adult bitches consume the faeces of their puppies, all other forms of coprophagia might be considered abnormal (Landsberg e.a., 2003). Although authors like Landsberg et al (2003) and Askew (2003) report that this behaviour is very common especially in pups and young dogs, the prevalence of coprophagia in the dog population is not known.

In the literature several factors have been hypothesised to cause coprophagia. In the first place physical causes like deficiencies or nutritional problems. These problems can arise either from the dog’s physical state or from the dog’s diet. Reed and Harrington (1981) reported that Beagles started to show coprophagia after deprivation of thiamine (vitamin B-1). However this might be ruled out as cause in our well fed Western pet dogs. Also coprophagia can be one of the clinical signs for exocrine pancreatic insufficiency (together with mild to marked weight loss, diarrhoea, fatty stool – light in colour and flatulence), and treatment will be aimed at replacing digestive enzymes (commercial products such as Pancrezyme ® or Viokase-V®). Furthermore it is suggested that gender, hunger, stress and/or boredom, and social learning (Askew, 2003; Serpell, 2002; Beerda e.a., 1999) might be causes of coprophagia. But, as far as we know, not one single published research is focused on the risk factors of coprophagia in dogs.

However, as long as we are not able to properly assess the cause of the stool eating behaviour, the therapy is likely to be unsuccessful. In order to understand the possible motivations underlying this problem behaviour we started a pilot study. The goal of this study was to estimate the prevalence of coprophagia and quantify risk factors, which might contribute to the development of coprophagic behaviour.

Materials and methods

In this study 517 dogs, considered by their owner to have a behavioural problem and therefore sought therapeutic help, were investigated for their coprophagic behaviour. Only 2 owners reported coprophagia to be the problem.

Information about the dog's behaviour was noted on a standardized client's fact sheet, from which five groups of risk factors were selected:

- Physical and behavioural characteristics of the dog: age (until one year vs one year and older), breed (retrievers vs all other dogs), gender (female vs male)
- Satiation and hunger: castration (yes vs no), style of eating (greedy vs normal to slow), weight (normal or overweight vs underweight), meals per day (two or more vs one)
- Stress: chasing (shadows and/or own tail vs no or other), pica (yes vs no) and amount of different owners a dog had (one vs two or more)
- Under stimulation (boredom): walks per day (one vs two or more), play (yes vs no) and training (yes vs no)
- Amount of dogs raised by the owner (one vs two or more) and mother with nest until 7 weeks (no and unknown vs yes)

Preliminary statistical analysis was performed using logistic regression in which a group of dogs with coprophagia and a group of dogs without this behaviour were compared with respect to presence of hypothesized risk factors. The strength of the association between a factor and coprophagia is calculated through an Odds Ratio (OR), which is an approximation of the Relative Risk. An OR greater than 1 indicates a positive statistical association between factor and behaviour, identifying the factor as a risk factor. An OR less than 1 indicates a negative statistical association: in that case the factor may be seen as having a preventive effect for the behaviour. An OR of 1 suggests that there is no association at all. The OR is significantly greater or less than 1 if the value 1 is not included in the confidence interval. The further the deviation is from 1, the stronger the association between factor and disease. Thus, the OR can be interpreted as the excess of risk of showing the behaviour due to exposure to a certain factor.

In this paper only outcomes of univariable analysis of dogs eating dog faeces are presented. Analysis of dogs eating all kind of faeces is in progress. To correct for confounding and/or interaction, a multivariable analysis needs to be done.

Results

Almost half of the 517 problem dogs (= 231), representing different breeds and age classes, show intra- and/or interspecific coprophagia. Of these coprophagic dogs 59 (25.5 %) showed intraspecific coprophagia. More than half of these dogs (55.9 %) eat only faeces from other dogs, whereas 37.3 % only eat their own faeces. Four dogs consume their own faeces as well as faeces from other dogs (table 1).

Table 1: Distribution of the type of dog faeces eaten

Types of dog faeces	N	%
Only own faeces	22	37.3
Only other dog's faeces	33	55.9
Both	4	6.8
Total	59	100

The risk factor gender was analysed for different types of faeces eaten (table 2). Female dogs (50.9 %) showed more often ($P < 0.05$) coprophagic behaviour of all types of faeces than males (40.5%). Also females (38.5%) eat more often ($P < 0.05$) stool from other animals than

males (29.8%). However, analysis of dogs which only eat dog faeces shows no gender difference (N.S.; 12.4% versus 10.7%).

Table 2: The prevalence (Prev) and Odds ratio's (OR) of the risk factor gender for three types of faeces eating

Type of faeces eaten	Risk factor	n	%	Prev	OR	95% CI	P wald
All types	Female	218	42.2	50.9	1.53	1.07-2.17	0.0186
	Male	299	57.8	40.5	Ref		
Only dog faeces	Female	218	42.2	12.4	1.18	0.68-2.03	0.5526
	Male	299	57.8	10.7	Ref		
Only other animal faeces	Female	218	42.2	38.5	1.48	1.02-2.14	0.0374
	Male	299	57.8	29.8	Ref		

The univariable analysis for the other 14 risk factors was focused on dogs eating dog faeces. This analysis revealed 6 of these 14 factors to be significant (table 3). Castrated dogs (14.9 %) eat more often ($P < 0.05$) dog faeces than not castrated dogs (9 %). Dogs with a greedy style of eating (17.7 %) show more often ($P < 0.05$) intraspecific coprophagia than dog with a normal or slow style of eating (8.6 %). Also retriever breeds (18.3 %) show this behaviour more frequently ($P = 0.05$) than other breeds (10.3 %). Dogs that chase shadows and/or their own tail (18.5 %) also eat more frequently ($P = 0.01$) dog faeces than non chasing dogs (9.5 %). Furthermore dogs with mothers absent from the nest (14.9 %) eat more often ($P < 0.05$) dog stool than dogs that had their mother with the nest (9 %). Finally dogs being with their first owner also show more often ($P < 0.05$) dog faeces eating behaviour than dogs being with their second or later owner (7 %).

Table 3: The prevalence (Prev) and Odds ratio's (OR) of the other significant risk factors for eating dog faeces

Risk factor		n	%	Prev	OR	95% CI	P wald
Castration	Yes	195	37.8	14.9	1.76	1.02 -3.05	0.0437
	No	321	62.2	9.0	Ref		
Style of eating	Greedy	158	30.6	17.7	2.28	1.32 -3.95	0.0033
	Normal to Slow	359	69.4	8.6	Ref		
Breed (retriever)	Yes	71	13.7	18.3	1.95	0.99 -3.83	0.0525
	No	446	86.3	10.3	Ref		
Chasing	Shadow + tail	108	20.9	18.5	2.16	1.20 -3.88	0.0103
	No + other	409	79.1	9.5	Ref		
Mother with nest	No + unknown	47	14.2	25.5	2.62	1.24 -5.54	0.0118
	Yes	285	85.5	11.6	Ref		
Different owners	1	359	69.6	13.4	2.05	1.03 -4.06	0.0399
	2 or more	157	30.4	7	Ref		

Conclusion and discussion

In this research population about half of the problem dogs show one or more types of coprophagic behaviour. About one out of ten dogs eat dog faeces. Wells and Hepper (2000) found a prevalence of 12.9 % coprophagia reported as a problem by owners of dogs within 4 weeks of purchase from an animal rescue shelter. Unfortunately this percentage is not comparable with our findings, because it was not clear what types of coprophagia was asked for, since only 'eats faeces' was listed in the questionnaire.

The clear difference between the percentages of dogs eating their own faeces and dogs eating other dogs faeces, while only 6.8 % eat both types of dog faeces, suggest different causes for intraspecific coprophagia. Due to lack of data it was not possible to differentiate between the different types of intraspecific coprophagia (own faeces of other dog's faeces) and to assess the risk factors for each type.

Female dogs show significantly more often coprophagia than males. This is in concordance with the findings of Askew (2003). Why females show this behaviour more often is unknown. The other significant risk factors indicate different type of causes for coprophagia of which hunger (castration and greedy style of eating) and stress (chasing shadows and/or own tail) are the most obvious one.

In order to study prevalence and risk factors for coprophagia more in depth we designed an internet survey (in Dutch) for dog owners (www.dierenwetenschap.com). So not only prevalence can be determined, but also do we hope to gather enough data to quantify the risk factors for the different types of coprophagic behaviour. Also other risk factors like age at the onset of the problem, source of purchase of the dog and type of dog food need to be investigated. Understanding the causes and risk factors is the first step in a better understanding of development of coprophagia. With that we might be more able to help dog owners to prevent, control or solve this unwanted behaviour.

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Keywords

Dog, problem behaviour, coprophagia, prevalence, risk factors

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