

MICROBIOLOGICAL AND ENVIRONMENTAL HYGIENIC EXAMINATIONS TO SELECTED BACTERIAL PATHOGENS IN DOG DROPPINGS

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SUMMARY

Due to the parasite *Neospora caninum* it was examined which other pathogens can be found in dog droppings and how their concentrations change over different periods of time.

The results of the microbiological examinations showed that the concentrations did not decrease much, so that dog droppings on pastures turn out to be a risk for livestock or humans.

The dog droppings were photographed weekly to document their decay, which took without protection about one-and-a-half month and with a shelter up to four months.

For the environmental hygienic examination the actual number of dog droppings on pastures was counted. The closer to towns the more dog droppings could be found.

Keywords: dog droppings, tenacity of pathogens, soil samples, actual number of dog droppings on pastures

1. INTRODUCTION

Currently there are about 5 million dogs in Germany, which results in about 1.500 tonnes of dog droppings each day (OHR and ZEDDIES, 2006).

This is not only an aesthetic but also a hygienic problem. A big discussion was initiated over a parasite called *Neospora caninum*, which causes abortions in cattle (SCHARES et al., 2005).

But there are several pathogens that can be found in dog droppings.

2. OBJECTIVES

In this study dog droppings were microbiologically examined for the presence and the concentrations of *Campylobacter* spp., *Clostridium perfringens*, *Enterococcus* spp., *Escherichia coli*, *Salmonella* spp. and the total number of bacteria. Furthermore pastures and meadows were checked for the actual number of dog droppings, because no any data was available.

3. MATERIAL AND METHODS

For the microbiological examination dog droppings were collected in animal shelters, numbered and set out on a meadow. The examination included two series.

There were 45 dog droppings in the first run of which 14 were examined microbiologically. In addition to the 14 dog droppings, droppings from a cow, a pig and a horse were examined for comparison.

Due to the rainy weather and the weekly sample drawing the first run was over after about one-and-a-half months, so that meaningful results could not be expected.

For this reason a second run was done, this time with a total of 39 dog droppings. Twenty of these droppings were put under a shelter to protect them against rain and direct sunlight so that a part of the samples could be saved for a longer time.

Ten droppings from under the shelter and ten without protection were microbiologically examined.

This run lasted about four months and samples were taken five times.

The dog droppings on the testgrounds of both series were photographed each week to document their decay.

During these two series soil samples were taken three times to assess if any bacteria in the droppings were washed out into the soil. The samples were taken in a depth of 1–3 cm from different points of the testground, a few from spots where dog droppings have been, others at the margin of the testground where no droppings have been.

The environment hygienic examination composed the stepping out of agricultural used greenland to acquire the actual number of dog droppings, because most of the studies to similar topics use the “worst-case-scenario”, which is far away from reality. The meadows which were examined had different distances to residential estates.

Particularly suitable were meadows with a length of 200 metres and a width of about 100 metres. The meadows were divided in 0–50 cm, 0.5–2m, 2–5m and 5–10 m from the border.

4. RESULTS

4.1 Results of the microbiological examination

Pathogen	First run	Second run	Soil samples
<i>Campylobacter</i> spp.	Found in the cow (50% <i>C. coli</i> , 50% <i>C. jejune</i>) and in the pig (92.6% <i>C. fetus fetus</i>) droppings	Found in one dog dropping, clear detection under the microscope	Not found
<i>Clostridium perfringens</i>	Concentrations ranged between 10^2 and 10^7 . Concentrations of horse and cow samples very low (about 10^1), later no more detectable.	Concentrations ranged between 10^3 and 10^7	Concentrations under elapsed droppings ranged between 10^4 and 10^5 , rest ranged between 10^2 and 10^3
<i>Enterococcus</i> spp.	Concentrations ranged between 10^3 and 10^9	Concentrations ranged between 10^4 and 10^9	Concentrations under elapsed droppings were around 10^4 , rest were about 10^3
<i>Escherichia coli</i>	Concentrations ranged between 10^4 and 10^7	Concentrations ranged between 10^3 and 10^9	Concentrations under elapsed droppings were around 10^5 , rest were about 10^2
<i>Salmonella</i> spp.	Not found	Found in two dog droppings, <i>Salmonella</i> spp. belonged to the group Anti O–4.5.	Found under one of the elapsed dog dropping which contained <i>Salmonella</i> spp., also Anti O–4.5
Number of whole bacteria	Concentrations ranged between 10^6 and 10^{10}	Concentrations ranged between 10^7 and 10^{10}	Concentrations ranged between 10^7 and 10^8

Campylobacter spp. was detected only in the fresh dropping samples and could not be detected later.

The concentrations of *Clostridium perfringens* in the horse and the cow dropping samples were very low. The reason may be the exclusively vegetarian alimentation.

The concentrations of the examined pathogens did not decrease as expected what may be due to the different spots on the droppings from where the samples were taken.

The results of the soil samples indicate a possible washing out of some of the bacteria to the soil during the decay.

4.2 Results of the environmental hygienic examination

The results of the environmental hygienic examination were as expected: a lot of dog droppings were found close to towns and on the borders of pastures and meadows.

It was conspicuous that in the areas where a green corridor exists on the opposite side of the walk, many more of the dog droppings were found there (up to 19 droppings on 200 metres).

The larger the distance to towns the fewer dog droppings were found, sometimes no dog dropping was found.

The number of the dog droppings depends strongly on the walk. There are some walks that are highly frequented by dogs; others close to towns seem not as attractive for walking dogs.

The most contaminated meadow was located near to highly frequented roads and not too far away from town, so it can be reached easily by foot or by car. On this meadow 42 dog droppings were found within the first ten metres from the border.

The total decay of the droppings without protection took an average of one month, with the protection of the shelter up to four months. The shelter surely does not reflect the real conditions but it is close to the circumstances if the dropping is for examples set under a tree or a bush.

A big influence on the decay of the droppings had the weather but also insects like worms, beetles or flies contribute to the decay, because some of them need the droppings as nutrition.

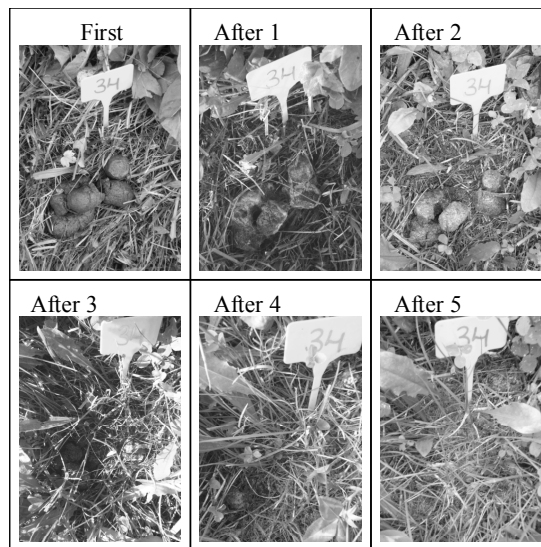


Figure 1. Example for the decay of a dog dropping without protection

5. CONCLUSIONS

The results of the laboratory examinations show that each dog dropping on meadows and pasture is a potential and long-term disease-source for livestock or humans.

Thereby not only grass for feeding is endangered, but also herbal products like crops or fruits

So pathogens in dog droppings can enter the food chain of humans by contaminated meat, crop or fruit.

Solutions to reduce the contamination of the environment with dog droppings can be the installation of so called “dropping stations” on strongly frequented walks where the dog owners find plastic bags and bins for disposal of their dog’s droppings, or special “dog meadows” in or close to residential areas, which are cleaned up regularly by the sanitation department or by voluntary dog owners.

Additional informative signs should be placed in highly frequented areas to inform the population about possible risks that can come from dog droppings.

Some farmers provide marked border areas of their pastures to dogs, which is a real good possibility to keep the dogs away from the grass that is used for feed.

Another alternative may be the enclosure of the agriculturally used areas, but that goes along with high costs and endeavours for the farmers.

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