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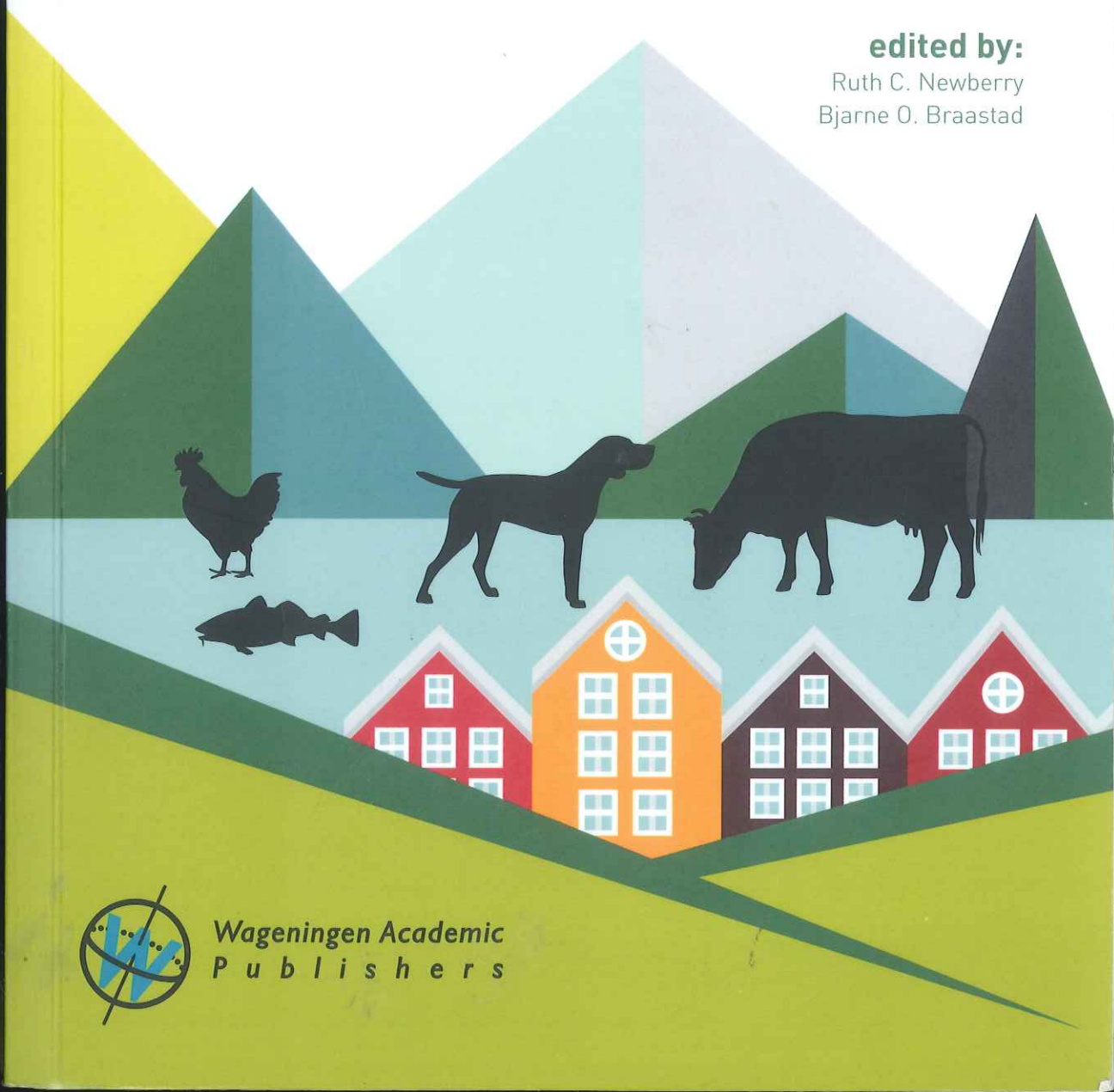
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**Role of range use in infections with parasites in laying hens**

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In organic layer farms a free-range area is provided for animal welfare reasons. Both higher and lower worm burden (*Ascaridia (Asc)*, *Heterakis (Het)* and *Capillaria (Cap)*) are described in hens housed in free range systems compared to other systems. Parasite infections can reduce health, welfare and productivity. We investigated the role of the range area in helminth infections: (1) Is infection of manure different for samples being collected in the free-range or inside the house, assuming to distinguish 'outdoor hens' from 'indoor hens'? (2) Is there an association between the proportion of hens using the range area and parasite eggs in soil and manure? (3) Is there an association between parasite eggs in manure, health and production parameters? Forty one flocks are being visited once when hens >45 weeks old and >3 weeks after a deworming. Together with farmers the proportion of hens using the free-range was estimated assuming optimal conditions (%HensOut), as well as health status (score on scale 1 (=bad) to 10 (=perfect)). Lay % at 60 weeks and mortality % till 60 weeks were collected too. Six soil samples per farm were taken at 5, 20 and 50 m from the pop-holes. Seventy individual manure droppings, pooled into 7 samples were collected inside and 70, pooled into 7, outside. On the free-range, manure samples were collected >50 m from the pop-holes, assumed to originate from 'outdoor hens'. Manure samples inside were taken from the inner part of the barn, away from the pop-holes, assumed to originate from 'indoor hens'. All soil and manure samples, 20 per farm, were analysed for parasite eggs per gram (EPG; McMaster method). This abstract contains preliminary results from 14 farms. From the soil samples (n=84) 7% was infected with *Asc*, 5% with *Het* and 0% with *Cap*. From the manure samples collected outside (n=98), 76% was infected with *Asc* and 26% with *Het*. From the manure samples collected inside (n=98), this was respectively 68 and 14%. There was no difference in number of positive manure samples between outside and inside, neither for *Asc*, nor for *Het*. A negative correlation between %HensOut and soil samples infected with *Asc* was found (-0.57; P=0.034). A tentative explanation may be that the hens' behaviour changes the soil surface into an environment detrimental to parasite egg survival. No correlation was found between %HensOut and soil samples infected with *Het*. Furthermore, no correlation was found between %HensOut and manure samples infected with *Asc*, nor with *Het*. No correlation was found between manure samples positive for *Asc* and health status, lay% 60 weeks or mortality till 60 weeks. Furthermore, no correlation was found between manure samples positive for *Het* and health status, lay% 60 weeks or mortality % till 60 weeks. These preliminary results indicate that range use may not be a risk factor for parasite infections in laying hens.



# Role of range use in infections with parasites in laying hens



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## Introduction

In organic egg production a free-range area is provided for animal welfare. Both higher and lower worm burden (*Ascaridia* (Asc), *Heterakis* (Het) and *Capillaria* (Cap)) are reported for hens in free-range systems compared to other systems. Parasite infections can reduce health, welfare and productivity.

## Questions

1. Is infection of manure different for samples from 'outdoor hens', compared to 'indoor hens'?
2. Is proportion of hens using the free-range correlated with parasite eggs in soil and manure?
3. Are parasite infections correlated with health and production parameters?

## Methods

- 20 Dutch flocks > 45 weeks old and > 3 weeks after a deworming.
- Farmers' estimate of range use (%HensOut) & health status
- Lay % at 60 weeks & mortality % till 60 weeks
- 6 soil samples/farm at 5, 20 and 50 m from pop-holes
- 70 individual droppings, pooled into 7 samples from outside > 50 m from the pop-holes (outdoor hens)
- 70 droppings, pooled into 7 samples from inside (indoor hens)
- All soil and manure samples analysed for parasite eggs/gram (EPG; McMaster method).
- *Ascaridia* and *Heterakis* counted as one category (Asc+Het) since they could not always be distinguished.

## Results

	Asc+Het		Cap	
	% of samples positive	Mean EPG* (SD)	% of samples positive	Mean EPG* (SD)
Soil (n=120)	12	7 (7)	0	0 (0)
Manure outside (n=140)	94*	405* (590)	24	39 (56)
Manure inside (n=140)	75*	243* (355)	19	26 (40)

\* Deworming is commonly advised when Asc+Het > 200 EPG or when Cap > 1



Proglottids of tapeworm (*Railletina* spp) and adult roundworm (*Ascaridia galli*) in one dropping.

- # manure samples positive for Asc+Het collected outside was significantly higher, compared to # positive from inside (6.6 vs 5.3; p=0.004). Also, the mean EPG for Asc+Het was significantly higher in outside manure, compared to inside manure (405 vs 243; p=0.026).
- No correlations found between %HensOut and # soil or manure samples positive for Asc+Het, nor for Cap. No correlations found between %HensOut and mean EPG in soil or manure.
- Positive correlation found between # manure samples from 'indoor hens' positive for Asc+Het with mortality% till 60 weeks (Pearson correlation 0.495; p=0.026; n=20).
- No correlations found between # soil or manure samples from 'outdoor hens' positive for Asc+Het or Cap with the 'health according to the farmer', laying% at 60 weeks or mortality% till 60 weeks.

## Conclusions

- Manure from outside hens was more frequent infected with *Ascaridia* and *Heterakis* and had higher EPG, compared to manure from inside hens.
- Flock mortality was higher in case of a higher number of manure samples from 'indoor hens' being positive for roundworms. No other correlations were found between parasite infections and health or production parameters
- No association was found between %HensOut and parasite infections in soil or manure.