

## How to motivate laying hens to use the hen run?

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### Introduction

In organic agriculture, hens are kept in free range systems. A free range is an enrichment for the hens and brings several advantages for them. Laying hens may show behavioural elements that are not possible in a poultry house. For instance, sunbathing behaviour is only shown in direct sunlight and not in artificial light (Huber, 1987). Hens spend 35.3-47.5% of their time with food searching (Fölsch and Vestergaard, 1981) and, in natural habitats, invertebrate food appears to be an important addition to the diet (Savory *et al.* 1978). Free range systems may also have an influence on animal health and product quality. Lopez-Bote *et al.* (1998) suggested that some constituents of grass might be of interest for the production of eggs rich in (*n*-3) fatty acids.

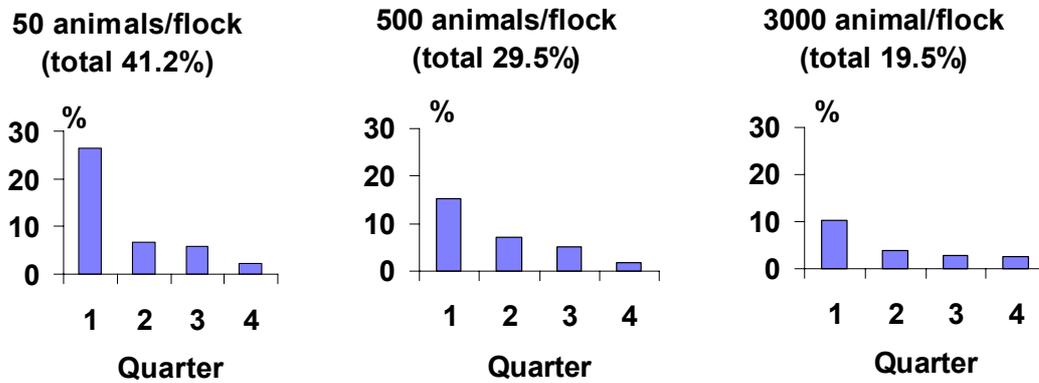
In flocks of free range hens, generally only a small proportion of the flock is outside at any one time, and most hens stay near the poultry house. In an account of the uneven distribution of the hens in the free range area, Menzi *et al.* (1997) found a nutrient and heavy metal overload on the frequently used parts of the run. For a better distribution, they, as well as several label programmes, recommend to structure the outdoor area with trees and installations providing shade and protection for the hens.

We attempted to determine management and structural factors that would result in more hens in the run and a more even distribution of the animals in several experiments, with a special emphasis on the idea that the hen run should be easily manageable for the farmer.

### Experiments

In the first study, with four groups of 50, 500 and 3,000 laying hens, the use of the hen run was compared with flock size. During the time the hen-runs were available to the laying hens, birds in the smaller flocks used it more often, i.e. the use of the hen run decreased with increasing flock size. Most hens stayed in the quarter nearest to the stable. Even in the small flocks, only few laying hens used the most distant quarter of the run (Figure 1).

**Figure 1:** Percentage of flocks in the hen run for the different flock sizes and distribution in the free range area.



A further question addressed was whether it is possible to improve the use of the run by scattering grain in the outdoor area during the rearing period (flock customisation). The experiment was done on four rearing farms with at least two groups of hens (test and control group) on each. The test group received grains in the run, the control group received grains only in the bad weather run.

In the middle and in the end of the rearing period, the number of animals in the run was not different with and without flock customisation. Furthermore, there was no difference in the distance to the poultry house between the animals of the two groups. However, some differences in the behaviour occurred. We suggest that, with flock customisation, food search activity increased but other factors than scattering grains have a bigger impact on the use of the free range.

In a next step, the effect of roofed dust baths on the use of the hen run was tested experimentally. We had four groups of 500 laying hens in each, ones with and ones without roofed dust baths at the end of the hen run to structure the free range area. We found no difference in the number of hens in the free range area with and without structure, but there was an influence on the distribution (Figure 2). When structures were located in the furthest quarter of the run away from the house, more hens were there with than without structure. In the nearest quarter, there were more hens without than with any structure in the hen run.

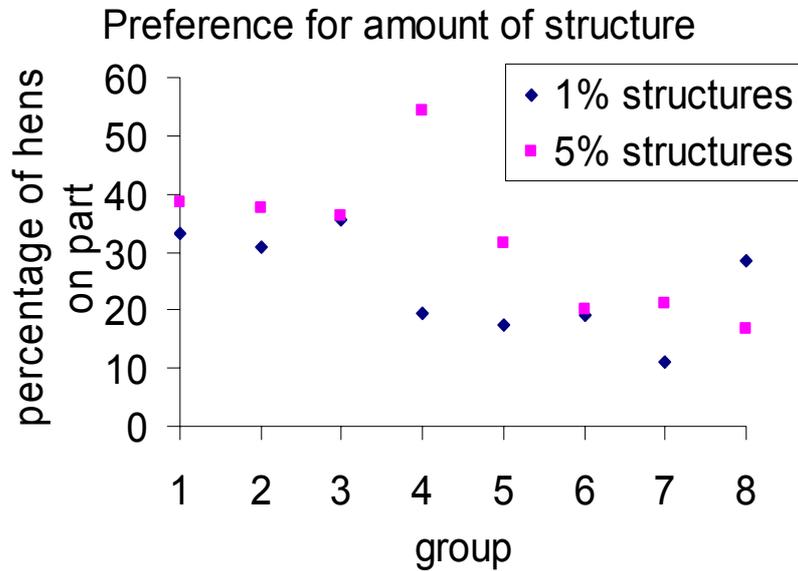
**Figure 2:** Distribution of hens in the four quarters of the hen run for eight groups of hens. White fields indicate a higher percentage of hens without structure and grey fields indicate higher percentage with structures in the fourth quarter of the hen run.

group	quarter 1	quarter 2	quarter 3	quarter 4
1				
2				
3				
4				
5				
6				
7				
8				

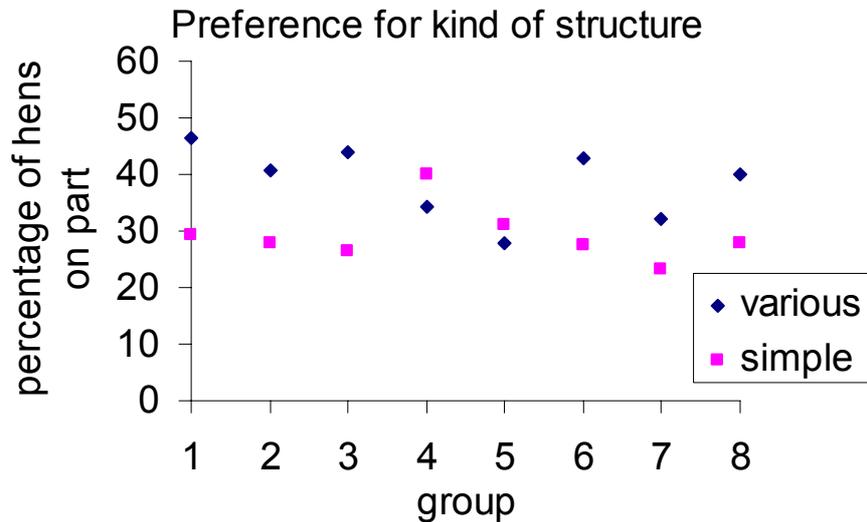
As even this small and distant structure had an effect on the distribution, we tried to find out more about the preferences of hens for a certain kind and amount of structuring elements. Eight groups of 20 hens and a rooster had a hen run that was optically divided into two parts. Two experiments were carried out. First, one part of the hen run had a shelter in the size of 1% of the area. The other part had five such shelters. Second, the less structured part was supplemented with four different objects of the same size. These four objects were a perch on two levels, a pecking-tree (vertical trellis on a stake with hanging corks), a box with fir-cones for scratching and two small fir-trees. The other part was the same as with five shelters.

In this choice experiment, we found no influence of the amount of structures on the use of the hen run (Figure 3), but the hens preferred the part with various structures (Figure 4) and they stayed evenly beside, under or on all different structures.

**Figure 3:** The percentage of the hens in each group, which are observed on the part with 1% of the run area covered with structures and on the part with 5% of structures respectively.



**Figure 4:** The percentage of the hens in each group, which are observed on the part with various structures and on the part with simple structure respectively.



## Discussion

The flock size is important for the use of the hen run and therefore we should keep laying hens in moderate flock sizes. But even in the smallest observed flock size of 50 hens, only 41.2% of the hens are outside simultaneously. Probably this is due to the fact that time consuming behaviours, such as feeding and drinking, are performed inside the poultry house, and the birds have not the time to be outside for a longer period. The distribution of the birds in the hen run did not differ much in the three group sizes. To improve the distribution, it appears, therefore, necessary to change other factors than group size.

Scattering grains in the hen run to bring the hens further away from the poultry house had only an effect on the activity of the hens in our experiment. However, the distribution could not be improved with this management measure. On the other hand, even a simple structure could improve the distribution of the hens in the free range area. Our results demonstrated that the quality and variation of structures influence the use of the hen run more than the amount of structures. Probably this is due to individual differences in the hens, with some being attracted by some structures more than the others. There may also be different needs in different phases of a birds life.

In the last part of this project, we will try to improve the structure of several commercial farms according to these results and in discussion with the farmers and compare the use of the hen run of the “improved” group with a control group on the same farm.

## Acknowledgements

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