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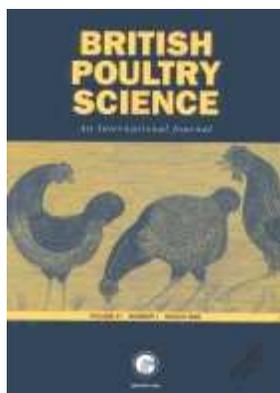
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Choice of nest types by hens of broiler breeder lines

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5 **1 Choice of nest types by hens of three lines of broiler breeders**

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15 5 Running head: NEST CHOICES OF BREEDER HENS

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28 10 **Abstract** 1. Choice of three different nest types by hens of broiler breeder lines was
29
30 11 investigated: metal nests (width 26 x depth 29 x height 33-45 cm) with inclined
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32 12 rubber mats, metal nests of the same size with litter, and larger wooden nests (30 x
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34 13 40 x 38) with litter. Three lines were studied: line B (324 females + 36 males), line P
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36 14 (315 + 36), and line WM (306 + 32). Each line was housed in a pen 23.3 x 3.9 m
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38 15 (90.7 m²); half the area was concrete floor with litter, and the other half raised plastic
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40 16 slats, on which stood 84 nests, 28 of each type, in two-tier blocks.

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45 17 2. Ninety five per cent of eggs were laid in nests, with significant variation between
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47 18 types: 63% metal littered, 30% wooden littered, and 2.3% metal **with inclined rubber**
48
49 19 **mats**. Choice between types was similar in the three lines. Hens of line B laid 66% of
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51 20 nest eggs in lower nests, P laid 57% and WM laid 64%.

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55 21 3. The other 5.1% of eggs were laid on the floor: 1.2% on the litter and 3.9% on the
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57 22 slats in front of the nests. It is suggested that some subordinate hens were excluded
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59 23 from nests, and therefore laid on the floor.

INTRODUCTION

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2 Broiler breeder lines of hens are kept to produce good hatching eggs, which require
3 clean, unbroken eggs in clean nests: each dirty or broken egg is an economic loss.
4 Sheppard *et al.* (2002) suggest that broiler breeder hens lay more floor eggs than
5 commercial egg layers, and Perry *et al.* (1971) found approximately 30% floor eggs
6 in a flock of broiler parent stock after 45 weeks of lay. **The high incidence of floor**
7 **eggs was not typical but could indicate the broiler breeder bird's specific preferences**
8 **for a particular nest box.** Factors contributing to increased floor eggs can be
9 categorised as genetic or environmental or the interactions between these. Selection
10 has caused differences among various strains. For example, the Ross 308 can be
11 expected to lay 3 to 6% floor eggs, the 508 about 5 to 7% and the 708 between 1 and
12 2% (Cox, 2005). Hens of light and heavy lines differ in laying behaviour. **For broiler**
13 **breeders there are relatively few studies on nesting behaviour although the**
14 **appropriate nests are important for heavy lines, because dirty or broken floor eggs in**
15 **broiler breeders mean greater economic loss than in laying hens.**

16 For the hen, the most desirable qualities for the nest site
17 are safety (concealment, inaccessibility to predators, good separation from
18 conspecifics), beneficial conditions for hatchability (dryness, protection from
19 extremes of weather, cleanliness), minimum stress for the sitting hen (proximity to
20 food and water, lack of disturbance) and beneficial conditions for the newly-hatched
21 chicks, such as for instance ease for the chicks to follow the mother hen (Wood-
22 Gush, 1983). For several of these reasons, an important factor in nest selection is
23 litter (Huber *et al.*, 1985). Appleby *et al.* (1988) compared littered and unlittered
24 wooden nests. Hens laid more than two thirds of eggs in littered nests. Freire *et al.*
25 (1996) compared pre-laying behaviour of hens in the presence or absence of litter in

1 the nest box. Hens with an unlittered nest box had longer duration of pre-laying
2 behaviour, longer searching phase, and shorter sitting phase. They made an increased
3 number of nest examinations during the searching and sitting phases, and made more
4 entries of shorter duration per entry into the nest box.

5 It is also important to consider size and number of nests. A
6 nest should be large enough to allow a hen to rotate within it (Kilgour and Dalton,
7 1984). The European Union (EU) Directive 1999/74/EC (EU, 1999) requires that in
8 alternative housing systems there should be at least one nest for every 7 hens, while
9 Damm (1993) recommends one nest for 4 to 5 hens and Leeson and Summers (2000)
10 suggest one nest for 4 hens.

11 In our experiment hens of three different broiler breeder
12 lines could choose between three types of nests: larger littered wooden or smaller
13 littered metal nests, and smaller unlittered metal nests with inclined rubber mats. The
14 aim of the study was to investigate the influence of the line, type of nest, position of
15 the nest (lower or upper tier) and periods of experiment (three experimental periods
16 of 12 d) on nest choice. For floor eggs we also investigated the location of laying (on
17 litter or elevated slatted floor).

18 19 MATERIAL AND METHODS

20 **Birds and housing**

21 The study was carried out in three windowless pens of broiler breeder lines of
22 Slovenian provenance Prelux. In the first pen was line B (a female line, with 324
23 hens + 36 cocks), in the second line P (another female line; 315 + 36), and in the
24 third line WM (a male line; 306 +32). The main goal of these lines is production of

1 hatching eggs. Pens were identical. Each pen was 23.3 x 3.9 m (90.7 m², giving 3.7
2 – 4.0 animals per m²), with 51% of the area as raised plastic slats, 45 cm higher than
3 the remaining concrete floor that was covered with dry wood shavings as litter.
4 Circular drinking troughs (providing 1.6 – 2.0 cm per bird) and round automatic
5 feeders (7.1 – 8.0 cm per animal) with a complete feed mixture were hung over the
6 slats. Each day, 2 kg oats was scattered on the litter in each pen to stimulate
7 searching behaviour and litter manipulation. Negative pressure ventilation and
8 artificial lighting in two lighting periods per day (3L:3D:7L:11D commencing at
9 07.00 h) were provided. Such a lighting programme has no influence on egg
10 production, but can reduce costs of electrical energy.

11 Nest boxes stood on the edge of the slats facing the slatted area. There were
12 84 in each pen, giving 3.6 to 3.9 per bird, with 28 of each of three types: metal nests
13 (width 26 x depth 29 x height 33-45 cm) with inclined rubber mats, metal nests of the
14 same size with wood shavings as litter, and larger wooden nests (30 x 40 x 38) with
15 litter. Wooden nests (WN) were in blocks with 8 nests each, metallic nests with litter
16 (ML) or with inclined rubber mats (MRM) in blocks with 14 nests each. These
17 blocks were disposed alongside the pen in the sequence 8WN-14ML-14MRM-
18 12WN-14MRM-14ML-8WN. All types of nests were in blocks with two tiers,
19 arranged to give easy access to each type from any part of the pen.

20 The hens of all three lines reached sexual maturity at 24 weeks of age. Egg
21 records started when the birds were 26 weeks old. Data were then collected in three
22 12 d observation periods separated by intervals of 12 d. Eggs were collected 5 times
23 per d (07.00, 08.00, 09.00, 13.00 and 19.00 h), noting numbers in each nest type
24 (including tier) and in each location for floor eggs (litter or slats). In the first
25 collection period production rate was 40.8%, 29.6%, and 47.1%, in the second

1 67.9%, 60.3%, and 63.8%, and in the third 68.1%, 63.6%, and 60.7% for lines B, P,
2 and WM.

3 **Statistical analyses**

4 Data on choice of nest types by hens within a pen were not fully independent.
5 However, partial independence was achieved by the use of multiple egg collections
6 per day, limiting the extent to which birds were influenced by eggs laid earlier, and
7 by the fact that the experimental unit used for statistics was not individual eggs or
8 hens but “observations.” The number of observations (n) for nest type and nest
9 position was altogether 648 (Table 1). That is a product of 36 d x 3 lines x 3 nest
10 types x 2 nest positions. The number of observations for floor egg position is a
11 product of 36 d x 3 lines x 2 egg positions: n = 216.

12 **Nest choices were assumed to be independent from day to day, because in large**
13 **groups of birds interactions among animals cannot be accounted for.** Because
14 number of eggs as a trait belongs to count data, Poisson error structure was assumed
15 for number of eggs laid in different types of nests and for distribution of floor eggs.
16 The proportion of floor eggs was treated as a binomial trait. Data were analysed by
17 the GENMOD procedure (Generalised Linear Models) in SAS/STAT statistical
18 software (SAS software, version 8e, 2000), which allows distributions other than a
19 normal one. The log-linear model for nest eggs (1) included collection period (C_i),
20 line (L_j), nest type (T_k), and nest position (P_l) as fixed effects. Interactions between
21 collection period and line (CL_{ij}), collection period and nest position (CP_{il}), line and
22 nest type (LT_{jk}), and between line and position (LP_{jl}) were also included. The log-
23 linear model for floor eggs (2) contained collection period (C_i), line (L_j), egg
24 position (P_k), and interactions between collection period and line (CL_{ij}), collection

1 period and nest position (CP_{ik}), and between line and egg position (LP_{jk}). The
 2 logistic regression model for proportion of floor eggs (3) contained collection period
 3 (C_i), line (L_j), and interaction between collection period and line (CL_{ij}). Because
 4 each line was housed in a separate pen, the effects of line and pen are confounded
 5 and cannot be separated.

$$7 \quad y_{ijklm} = \mu + C_i + L_j + T_k + P_l + CL_{ij} + CP_{il} + LT_{jk} + LP_{jl} + e_{ijklm} \quad (1)$$

$$8 \quad y_{ijkl} = \mu + C_i + L_j + P_k + CL_{ij} + CP_{ik} + LP_{jk} + e_{ijkl} \quad (2)$$

$$9 \quad y_{ijk} = \mu + C_i + L_j + CL_{ij} + e_{ijk} \quad (3)$$

10 The appropriate link function for the Poisson distribution is $\log(g(\mu) = \log(\mu))$; the
 11 associate variance function is $V(\mu) = \mu$. The link function for binomial distribution
 12 is logit ($g(\mu) = \log(\mu/(1-\mu))$); the associate variance function is $V(\mu) = \mu(1-\mu)$.
 13 Selection of the model was based on goodness-of-fit test, where difference in
 14 deviance and degrees of freedom were considered. Estimated differences in results
 15 are presented on a log scale because log linear or logistic regression models were
 16 used. Thus, comparisons are not additive but multiplicative.

18 RESULTS

19 Overall 95% of eggs were laid in nests: 63% in metal littered nests, 30% in wooden
 20 littered and 2.3 % in metal nests with rubber mat. Of the 5.1% floor eggs less than
 21 one quarter was laid on floor litter (1.2%) and the remainder on the slats in front of
 22 the nests (3.9%). General descriptive statistics of egg distribution are given in Table
 23 1.

1 **All factors:** collection period, nest type, line and nest position had significant
2 effects on the distribution of nest eggs (Table 2). All interactions included were also
3 significant. The effect of line was not significant in the model for floor egg
4 distribution ($P = 0.93$), while other effects and interactions included were significant.
5 **As mentioned above, the effects of line and pen cannot be distinguished in practice**
6 **and any possible pen effects may be appreciable.** The collection period and
7 interaction between collection period and line were significant for the proportion of
8 floor eggs, while the line showed only a trend ($P = 0.095$).

9 **Collection period**

10 The difference between the first and the second collection period was -0.49
11 (Table 3), and as $\exp(-0.49) = 0.61$ this means that hens in the first collection period
12 laid 0.61 as many eggs as in the second period. Conversely they laid 1.64 times as
13 many in the second, and 1.67 times as many in the third, as in the first period. The
14 difference between the second and the third collection period was not significant ($P =$
15 0.317). Similarly, the difference between lines B and WM was not significant ($P =$
16 0.386). However, hens of line P laid 1.24 times more eggs than line B and 1.19 times
17 more than WM.

18 **Nest type**

19 Hens of all lines preferred the metal littered nests more than the wooden littered nests
20 and both more than the metal nests with rubber mats (Table 3). When results from
21 the lines were combined, twice as many eggs were laid in metal littered nests as in
22 wooden littered nests. There were more than 22 times as many eggs in metal littered
23 nests, and more than 11 times as many in wooden littered nests, as in metal nests
24 with rubber mats. Lower nests were used more than upper nests, with 1.66 times
25 more eggs laid there.

1 **Lines**

2 Differences between lines were relatively minor (Table 4). Hens of line B laid 0.78
3 times as many eggs in wooden littered nests as line P and 0.83 times as many as
4 WM, but they laid more in metal littered nests than the other two lines (1.61 and 1.12
5 times respectively).

6 Hens of line P laid less in metal littered nests (0.70 times as many eggs) than line
7 WM. In metal nests with rubber mats only two differences were significant. Hens of
8 the line B laid only 0.42 times as many eggs in these nests as line P, while those of
9 line P laid 2.26 times more eggs in them than line WM.

10 **Nest position**

11 Hens of all lines preferred lower nests (Table 5). Lines B, P and WM laid 1.92, 1.34
12 and 1.79 times more eggs in lower than in upper nests, respectively (they laid 66, 57
13 and 64% of nest eggs in lower nests, respectively). Slightly more eggs were laid in
14 lower nests in the second collection period (1.81 times as many as in upper nests)
15 than in first and third periods (1.60 times).

16 **Floor eggs**

17 The number of eggs laid on the floor decreased over time. Hens laid 0.68 as many
18 eggs on the floor in the second and 0.41 as many in the third collection period as in
19 the first one (Table 6). In the third collection period there were 0.60 as many floor
20 eggs as in the second. In each line the differences between the first and the third
21 collection period were greater than differences between the first and the second
22 (Table 7). The only difference between periods within lines that was not statistically
23 significant was that between the second and the third collection period in line WM.

24 Floor eggs were found on the slats 3.21 times more often than on the litter. In
25 lines B, P and WM this difference was 5.21, 2.62 and 2.42 times more respectively

1 (Table 8), while the ratio was higher in the second (4.08) and third (3.66) collection
2 periods than in the first (2.21). As with the number of floor eggs, the proportion of
3 floor eggs decreased over time (Table 9), being in the second period 0.46 times that
4 in the first, and in the third 0.53 times that in the second. In the first collection period
5 the proportion of floor eggs was similar in lines B and WM, while line P had a
6 proportion 1.69 and 1.52 times greater than WM and B respectively. In the second
7 period differences between lines were similar to those in the first. Differences
8 between lines changed in the third collection period, when line P had a lower
9 proportion of floor eggs than lines B and WM (0.67 and 0.65 times respectively).

11 DISCUSSION

12 For both hens and producers, the most appropriate place for laying is the nest, and
13 the broiler breeders in our experiment laid 95% of eggs in nests. Of these, 98% were
14 in littered nests, showing a preference for littered nests even greater than found for
15 laying hens (Appleby *et al.*, 1988). The other distinct preference shown was for
16 lower nests, which was found in all three collection periods. This trend has also been
17 observed in laying hens: Appleby and McRae (1986) offered birds two tiers of nests
18 and both light and medium hybrids generally preferred the lower tier.

19 The preference for litter was such that 93% of all eggs were found in littered
20 nests. Amongst those littered nests, though, hens choose smaller metal nests nearly
21 twice as often as larger wooden nests. This is rather difficult to explain, as the few
22 recommendations that have been made on nest size tend to favour larger nests.
23 Kilgour and Dalton (1984), for example, recommend nests large enough to enable
24 birds to rotate within them. However, one possible explanation is offered by the

1 estimation of Sherwin and Nicol (1993) that half of the laying hens they studied were
2 gregarious and half solitary in their nesting behaviour. We can presume that in our
3 broiler breeder lines more hens had solitary nesting behaviour. In a large nest it is
4 more likely that the hen would get a companion than in a smaller one. **According to**
5 **Lewis *et al.* (2004), the broiler breeder hens have mean oviposition time 4:16 relative**
6 **to start of the photoperiod, if it lasts 13 h. Only dominant hens had really a choice of**
7 **nests, because there were not enough nests of each type for all hens. Perry *et al.***
8 **(1971) observed a defence of nest at dominant hens. We can assume that submissive**
9 **hens had fewer possibilities of laying in desired nests; therefore they sometimes laid**
10 **on the slatted floor in front of the nests.**

11 In the nest, litter is always a very important material (Huber *et al.*, 1985;
12 Appleby *et al.*, 1988; Freire *et al.*, 1996). Our findings support this statement.
13 However, the majority of floor eggs in the experiment were laid on the slats and not
14 on the litter. It seems likely that hens laid eggs on the slats in front of the nests while
15 waiting for a preferred nest to be available. Strong motivation to reach the nest in the
16 last 30 min prior to oviposition has been demonstrated by Cooper and Appleby
17 (1996) and Freire *et al.* (1997). Freire *et al.* (1997) also observed more frequent
18 movement in the hour prior to oviposition in subordinate hens. The larger number of
19 floor eggs on the slats in front of the nests suggested that subordinate hens waited for
20 a longer period of time prior to oviposition. Dominant hens could achieve entry to a
21 preferred nest and then defend it as a territory – as shown by Perry *et al.* (1971) in
22 broiler parent stock. If subordinate hens could not reach a nest, they laid on the
23 slatted floor.

24 The suggestion from Perry *et al.* (1971) that dominance can contribute to the
25 shortage of nests and cause floor egg laying, combined with the present results, raises

1 an important issue. The EU Directive 1999/74/EC (EU, 1999) requires at least one
2 nest for every 7 laying hens in alternative housing systems. We provided more than
3 one nest for each 4 hens, but one third of the nests (metal nests with inclined rubber
4 mats) were practically unused. Efforts to improve hen welfare should therefore take
5 into consideration the type of nests that hens prefer.

6 Floor laying declined with time. One factor that may have contributed to this
7 was the frequent collection of eggs (5 times per day). Leeson and Summers (2000)
8 recommended picking up floor eggs as many as 6 or even 8 times each day at the
9 start of egg production. The decrease in number of floor eggs was similar in lines B
10 and WM, but strongest in line P. This led to a shift in the differences in the
11 proportion of floor eggs between lines from the first and second collection period to
12 the opposite trend in the third period.

13 In conclusion, a preference for littered nests by hens of broiler breeder lines
14 was apparent. In addition, they preferred lower positioned nests. The number of eggs
15 laid on the floor decreased over the course of the experiment. However, 1.2% of all
16 eggs were laid on the litter floor and 3.9% on the slats. The number of floor eggs
17 could be even lower, if subordinate hens could use preferred nests at the time of
18 oviposition. **Among our three lines there were minor differences in contrast with
19 greater differences among various strains of Ross (Cox, 2005).**

21 ACKNOWLEDGEMENT

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23 the manuscript.

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1 **TABLE 1.** *Descriptive statistics for eggs laid in nests by nest type and nest position*
 2 *and for floor eggs by egg position.*

Item		n	Median	Minimum	Maximum
Eggs laid in nests					
Nest type	WL	216	21.5	1	118
	ML	216	48.5	14	108
	MR	216	2.0	0	10
Nest position	Lower	324	34.0	0	118
	Upper	324	16.5	0	72
Floor eggs					
Egg position	Slatted floor	108	6	0	15
	Littered floor	108	1	0	8

3 n – number of observations, WL – wooden littered nests, ML – metal littered nests, MR – metal nests
 4 with rubber mat

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5 2 **TABLE 2.** *Deviance, source of variability, and Wald statistics for distribution of*
6
7 3 *eggs laid in nests and floor eggs, and proportion of floor eggs.*
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Deviance	Eggs laid in nests		Floor eggs		% floor eggs	
	df	Value	Df	Value	df	Value
	628	1102.03	202	191.48	99	148.79
Effect	df	<i>P</i>	Df	<i>P</i>	df	<i>P</i>
Collection period (C)	2	<0.0001	2	<0.0001	2	<0.0001
Line (L)	2	<0.0001	2	0.935	2	0.0949
Nest type (T)	2	<0.0001	-	-	-	-
Position (P) ^a	1	<0.0001	1	<0.0001	-	-
C*L	4	<0.0001	4	0.0311	4	0.0020
C*P	2	0.0006	2	0.0004	-	-
L*T	4	<0.0001	-	-	-	-
L*P	2	<0.0001	2	<0.0001	-	-

4 ^a nest position for eggs laid in nests, egg position for floor eggs
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2 **TABLE 3.** *Estimated differences between subclasses with standard errors (SEE) for*
3 *collection period, line, nest type, and nest position in eggs laid in nests.*

Effect	Difference	Estimate	SEE	<i>P</i>	Exp(estimate)
Collection period	1 – 2	-0.49	0.021	<0.0001	0.61
	1 – 3	-0.51	0.020	<0.0001	0.60
	2 – 3	-0.02	0.018	0.317	0.98
Line	B – WM	-0.04	0.044	0.386	0.96
	P – B	0.21	0.038	<0.0001	1.24
	P – WM	0.17	0.016	<0.0001	1.19
Nest type	WL – ML	-0.71	0.048	<0.0001	0.49
	WL – MR	2.41	0.047	<0.0001	11.11
	ML – MR	3.11	0.016	<0.0001	22.50
Nest position	L – U	0.51	0.052	<0.0001	1.66

4 WL – wooden littered nests, ML – metal littered nests, MR – metal nests with rubber mat
5 L – lower position, U – upper position
6

1 **TABLE 4.** *Estimated differences with standard errors (SEE) between lines within*
 2 *types of nests in eggs laid in nests.*

Nest type/Difference	Estimate	SEE	<i>P</i>	Exp(estimate)
WL				
B – P	-0.25	0.033	<0.0001	0.78
B – WM	-0.19	0.034	<0.0001	0.83
P – WM	0.06	0.033	0.0608	1.06
ML				
B – P	0.48	0.025	<0.0001	1.61
B – WM	0.12	0.022	<0.0001	1.12
P – WM	-0.36	0.025	<0.0001	0.70
MR				
B – P	-0.86	1.106	<0.0001	0.42
B – WM	-0.04	0.027	0.741	0.96
P – WM	0.82	0.107	<0.0001	2.26

3 WL – wooden littered nests, ML – metal littered nests, MR – metal nests with rubber mat
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2 **TABLE 5.** *Estimated differences with standard errors (SEE) between nest positions*
3 *(L – U) within line and within collection period in eggs laid in nests.*

Effect	Estimate	SEE	<i>P</i>	Exp(estimate)
Line				
B	0.65	0.026	<0.0001	1.92
P	0.30	0.028	<0.0001	1.34
WM	0.58	0.027	<0.0001	1.79
Collection period				
1	0.47	0.032	<0.0001	1.60
2	0.59	0.025	<0.0001	1.81
3	0.47	0.025	<0.0001	1.60

4 L – lower position, U – upper position
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5 2 **TABLE 6.** *Estimated differences between subclasses with standard errors (SEE) for*
6
7 3 *collection period and egg position (S – L) in floor eggs.*
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Effect	Difference	Estimate	SEE	<i>P</i>	Exp(estimate)
Collection	1 – 2	0.38	0.082	<0.0001	1.47
p.	1 – 3	0.90	0.098	<0.0001	2.45
	2 – 3	0.51	0.107	<0.0001	1.67
Egg position	S – L	1.17	0.079	<0.0001	3.21

4 S – slatted floor, L – littered floor
5

TABLE 7. *Estimated differences with standard errors (SEE) between collection periods within line in floor eggs.*

Line/Difference	Estimate	SEE	<i>P</i>	Exp(estimate)
B				
1 – 2	0.34	0.130	0.0082	1.41
1 – 3	0.79	0.150	<0.0001	2.20
2 – 3	0.45	1.158	0.0049	1.56
P				
1 – 2	0.26	0.124	0.0320	1.30
1 – 3	1.17	0.164	<0.0001	3.21
2 – 3	0.90	0.170	<0.0001	2.47
WM				
1 – 2	0.54	0.138	<0.0001	1.72
1 – 3	0.74	0.148	<0.0001	2.09
2 – 3	0.20	0.163	0.226	1.22

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4 **TABLE 8.** *Estimated differences with standard errors (SEE) between eggs position*
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7 *(S – L) within line and within collection period in floor eggs.*
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Effect	Estimate	SEE	P	Exp(estimate)
Line				
B	1.65	0.140	<0.0001	5.21
P	0.96	0.125	<0.0001	2.62
WM	0.88	0.126	<0.0001	2.42
Collection period				
1	0.79	0.102	<0.0001	2.21
2	1.41	0.133	<0.0001	4.08
3	1.30	0.168	<0.0001	3.66

4 S – slatted floor, L – littered floor
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2 **TABLE 9.** *Estimated differences with standard errors (SEE) between collection*
3 *periods and between lines within collection periods for proportion of floor eggs.*

Difference	Estimate	SEE	<i>P</i>	Exp(estimate)
1 – 2	0.77	0.077	<0.0001	2.17
1 – 3	1.41	0.093	<0.0001	4.09
2 – 3	0.63	0.096	<0.0001	1.89
Collection period				
1				
B – P	-0.41	0.124	0.0010	0.66
B – WM	0.11	0.125	0.360	1.12
P – WM	0.52	0.127	<0.0001	1.69
2				
B – P	-0.22	0.130	0.0834	0.80
B – WM	0.28	0.144	0.0491	1.33
P – WM	0.51	0.145	0.0004	1.66
3				
B – P	0.40	0.196	0.0413	1.49
B – WM	-0.04	0.174	0.836	0.96
P – WM	-0.44	0.201	0.0301	0.65

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