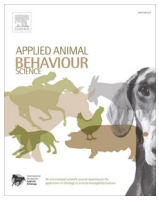
Applied Animal Behaviour Science 253 (2022) 105680

Contents lists available at ScienceDirect

Applied Animal Behaviour Science

journal homepage: www.elsevier.com/locate/applanim



Perch use in commercial broiler breeders – Preference for perch material and effect of age

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ARTICLE INFO

Keywords:
Broiler breeders
Perch
Motivation
Preference

ABSTRACT

Unlike for laying hens in most European countries, few broiler breeders have access to perches, and there is a need for more knowledge on perching behavior in broiler breeders. The aim of this study was to investigate the overall use of perches by broiler breeders throughout the production period and to investigate preferences for different perch materials in a commercial setting. Four breeder flocks (Ross 308, n = 2, Ranger Gold, n = 1, Hubbard JA 757, n = 1) were each given five different perches. Four of the perches (each 6 m long) were placed on the elevated slats; steel round, steel square, plastic and wooden perch, while the three Siesta perches (plastic, 15 cm high) were placed in the litter area. From week 30, one of the Siesta perches (3 m long) was placed on the elevated slats. Perch use was recorded by counting number of birds on the perches during the last hour before the light went off, once in week 20, 25, 30, 40, 45 and 50. Footpad dermatitis were scored at end of lay in 100 random hens across the house. Overall, perching behavior was constant with age, and there were no significant differences between the flocks with regards to perch use (birds/m perch). At 20 weeks of age, the square steel perches were most used (0.90 birds/m perch) and the wooden perches were the least used (0.41 birds/m perch) ($P = 0.09$). From week 30, more birds were perching on the Siesta perches on the slats (1.6 birds/m perch) compared to all other types of perches ($P < 0.003$). There was no relationship between body weight and footpad score ($P > 0.05$). The average perch use in the present study was only 0.44 birds/m perch which is a capacity utilization of less than 10 %. The Siesta perch on the elevated slats was the most popular perch, possibly due to its height. In conclusion, broiler breeders use perches, but perch type and placement of the perches must be considered carefully.

1. Introduction

Animal welfare includes good health, positive emotions and meeting the animals' behavioral needs. A well-known behavioral need for laying hens is perching (e.g. Olsson and Keeling, 2000; Newberry et al., 2001), such that perches are a key resource provided in both enriched cages and loose housed aviary systems. Perching is an anti-predatory behavior and perching on a high perch may give a greater feeling of safety compared to lower perches (Brendler et al., 2014). Despite being the same species as laying hens, there is currently no requirement for perches for broilers or broiler breeders in the EU and the provision of perches in breeder houses is limited. If commercial broiler breeder farmers are to include perches in their houses, the perch design and placement must be based on knowledge on the birds' preferences and perching behavior. Thus, there is a need for more knowledge on perching behavior in broiler breeders.

Laying hens prefer a high perch (60 cm above the ground) over a lower perch (15 cm) and the height appears to be more important than the material or type of the perch (Schrader and Müller, 2009). Many broiler breeder houses are equipped with elevated slats, which provides the birds with an elevated resting area. Studies on broilers have found that broiler chickens prefer to rest on platforms rather than perches when given a choice (Norring et al., 2016, 2019). The same was found in adult Ross 308 broiler breeders; when given a choice between elevated wooden slats and plastic perches (both 50 cm high) a majority of birds preferred to roost on the slats, while 23 % preferred the perches (Mens and van Emous, 2022). However, studies on preference for perch type and materials are scarce in broiler breeders and must be investigated further.

Some studies on laying hens report that the hens do not show a clear

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https://doi.org/10.1016/j.applanim.2022.105680
Received 1 April 2022; Received in revised form 7 June 2022; Accepted 13 June 2022
Available online 15 June 2022

preference for particular features such as perch material or width (Liu et al., 2018), while other studies report that they prefer flat and wide perches (<4 cm) over round and narrow perch designs (Struelens and Tuyttens, 2009; Pickel et al., 2010; Skånberg et al., 2021). Broiler breeders are heavier and have a different body conformation compared to laying hens (Zuidhof et al., 2014), and results from laying hens may not be directly applicable for broiler breeders. Vasdal et al. (2022) investigated perch use in broiler breeder pullet flocks (Ross 308 and Hubbard JA787, not the same flocks as in the current study) and did not find a preference between different perch materials (plastic, steel square, steel round and wood) or heights (35 cm or 95 cm). Brandes et al. (2020) investigated perch use by adult broiler breeders in commercial flocks of Ross 308, Ross 708 and the slower growing Ross Ranger. The birds were given perches (10 cm/bird) of different materials (plastic, metal, wood), shapes (square, oval, round, mushroom), heights (0 – 48 cm) and locations (littered area or elevated slats) depending on the farm. Unfortunately, a comparison of the materials could not be made in this study. The flocks used all the perches with a higher intensity during the dark period than during the day (2.07 birds/m perch versus 0.73 birds/m in the light period). The clearence height of the perches greatly affected the use, and the birds preferred perches with a minimum clearence height of 5.5 cm, indicating a preference for perches that the feet can grip around (Brandes et al., 2020).

With regards to age, some studies report a decline in perching behavior with increasing age in broiler breeders (Gebhardt-Henrich et al., 2017, 2018; Mens and van Emous, 2022), while Brandes et al. (2020) did not find a reduction in perching behavior with age. This could potentially be due to the lower perches in Brandes et al. (2020) which were more easily accessible for older, heavier birds. In general, lighter birds perch more than heavier birds both in laying hens (Kozak et al., 2016) and in broiler breeders (Gebhardt-Henrich et al., 2018). With regards to different hybrids, some studies show that the lighter hybrids perch more (Gebhardt-Henrich et al., 2018; Vasdal et al., 2022), especially during the dark period (Brandes et al., 2020). This difference might be linked with the ability influenced by body weight or different motivations to perch. More information on the perch use throughout the production period in commercial broiler breeders of different hybrids is needed.

Finally, while perches may fulfill behavioral needs it may also threaten the birds' health by causing physical harm (Sandilans et al., 2009). Observations have shown that perches may cause keel bone fractures (Gebhardt-Henrich et al., 2018) and breast blisters (Mens and van Emous, 2022). Furthermore, footpad dermatitis (FPD) is a serious welfare issue for broiler breeders with as much as 64 % of the birds showing severe lesions at slaughter (Kaukonen et al., 2016). FPD is an entry gate for pathogens and may lead to increased mortality in broiler breeders (Thøfner et al., 2019). Presence of perches may help reduce footpad dermatitis in broiler breeders (Gebhardt-Henrich et al., 2017), possibly through reducing the time spent in contact with the litter and slatted areas. FPD in broilers has previously been linked with increaed live weight (Kjaer et al., 2006), but there is scarce information on the relationship between live weight and FPD in different hybrids of broiler breeders. Therefore, more information on the prevalence of FPD in broiler breeders with access to perches is needed.

The aim of this study was therefore to investigate 1) overall use of perches by commercial broiler breeders at different ages throughout the production period, 2) preferences for different perch materials and 3) prevalence of foot pad dermatitis.

2. Material and methods

2.1. Study design

A total of four commercial breeder flocks (Ross 308 n = 2, Ranger Gold n = 1, Hubbard JA 757 n = 1) were observed at different ages during the production period (18–63 weeks of age from March 2021 to January 2022 on four different farms. The flocks were randomly selected from the company lists, and the flocks had not been included in previous studies on perching in the pullet period. Each flock had access to four different perch materials (each 6 m long, 24 m in total) that were placed on top of the elevated slats in a random order, 10 cm from the end of the slatted area (Fig. 1); a steel round perch (Ø 33 mm, Big Dutchman, Vechta, Germany), a steel square perch (40 mm, Big Dutchman), a mushroom shaped plastic perch (Ø 38 mm, APL/NAT, Big Dutchman) and a round wooden perch (Ø 35 mm, NAT, Big Dutchman). Due to difficulties with deliveries, the Hubbard flock never received the wooden perch. The plastic, wooden and steel round perches were placed in plugs (Big Dutchman, Plug PE APL) that elevated the perches 5 cm from the slats (Fig. 1). There were no available plugs that fitted the square perch, so the steel square perches were placed directly on the elevated slats. In addition, three mushroom shaped plastic Siesta perches (Siesta L3000, Big Dutchman) each 3 m long, 15 cm high and 8 cm wide (Fig. 1) were placed in the litter area. The Siesta perches are specifically designed for broiler breeders, and are made of hard plastic, with a mushroom shaped top with an even surface. Based on feedback from the farmers that the Siesta perch would likely be used more if we placed it on the slats, one of the Siesta perches (3 m) in each flock was placed on the elevated slats at 30 weeks of age (Fig. 1), leaving two Siestas perches in the litter.

Based on the average shoulder width of the Ross 308 (Aviagen, 2018), each meter of perch should theoretically accommodate a maximum of 7.1 (20 weeks old with 14 cm shoulder width), 6.8 (30 weeks old with 14.5 cm shoulder width) and 6.6 (40 weeks old with 15 cm shoulder width) birds respectively, if the birds perched shoulder to shoulder along the entire perch length. Information on the average shoulder width on Hubbard and Gold hens at different ages is not available, but they are smaller than the Ross birds. The estimates based on the width of the Ross hens will therefore likely be a small underestimate for the Hubbard and Gold hens. A total of 33 m perch/flock thus allows 2.9 %, 2.76 % and 2.69 % of the birds to perch in week 20, 30 and 40 weeks, respectively.

Because the study did not involve any adverse animal handling, experimental manipulations or invasive procedures, it was exempt from approval of animal use by the Norwegian Food Safety Authority (Norwegian Regulations on Use of Animals in Research, 2015).

2.2. Animals and housing

Each flock consisted of around 7300 hens and 800 roosters, kept in the same house. Both the roosters and the hens came from the same rearer, the roosters arrived at 17 weeks old and the hens at 18 weeks old. All houses were fully insulated with mechanical ventilation and concrete floor with wood shavings, nest boxes and elevated slats (60 cm above the litter). The width of the house and the slats varied between flocks (Table 1). All flocks were managed according to standardized practices according to the breeding companies and Norwegian regulation with regards to feed, water, ventilation, litter and lighting (Norwegian quality standard; KSL, 2020). The birds were sent to slaughter or gassed in the house around 63 weeks of age.

2.3. Observation of perch use

Pictures of each perch were taken by the farmers using their mobile phones at one night in week 20, 30, 40, and 50 during the last minutes before lights were turned off. The pictures covered the entire length of each perch. Perch use was then recorded from the pictures by one scientist counting number of birds on each perch.

In order to increase the number of observations per flock, each flock was visited by an observer at week 25 and 45, and perch use during the last hour before the lights were turned off was recorded through video recordings (Sony Handycam HDR-CX 405, Zaventem, Belgium, placed on tripods (Velbon EX-330, Yamanashi, Japan)). The cameras were

Fig. 1. Top left: placement of perches along the elevated slatted area, top right: the Siesta perch placed on the elevated slats from 30 weeks of age, bottom left: the perches were placed in plugs, elevating the perches from the slats, bottom right: the Siesta perch (figure: Big Dutchman).

Table 1
Details of the flocks and house lay out.

Flock	House width (cm)	Slat width (cm)	Nest width (cm)	Width of littered area (cm)	Hybrid	Hens placed (n)	Roosters placed (n)	Hen weight at arrival (g)[a]	Hen weight at end of lay (g)[2]
1	2050	250	200	1600	Ross 308	7456	503	1700	3968 ± 437
2	1500	720	200	580	Ross 308	7364	510	1705	4001 ± 489
3	1450	720	200	530	Ranger Gold	7316	577	1470	3280 ± 563
4	1480	720	200	560	Hubbard JA 787	7420	754	1729	2472 ± 212

[a] Mean based on the farmers' automatic weights. [2]Mean ± Std dev based on 100 assessed hens at end of lay.

placed around 2 m away from each perch. In the video analyses, number of birds on each perch were recorded every 2 min for one hour (n = 30 scans/flock/age).

2.4. Health recordings

At end of lay, footpad dermatitis (scale 0–4, score 4 being the worst, Welfare Quality®) was scored in 100 random hens in each flock. The weight of these same 100 hens was also recorded. These observations were done either at the abattoir or in the house after the birds had been gassed in the house.

2.5. Statistical analysis

Statistical analyses were performed using the software SAS 9.4 (SAS Institute Inc., Cary, NC, USA). The data collected from the pictures and from the videos of perch use were analysed separately. From the videos, the number of birds per perch in each scan (n = 30) was summed and averaged for the hour of observation. The number of birds observed perching per meter of perch available per flock per week of age was calculated. The use of perches was analysed using the mixed procedure, with perch type, week of age, and their interaction as fixed effects. The variable flock was included as a random factor. The data fit the model assumptions, e.g. normal distribution of the residuals. For the post-hoc analysis, where appropriate, the critical P-value was Bonferroni corrected to $\alpha = 0.002$ (i.e. 25 pairwise comparisons between perch type and week of age). For the analyses of the photographs, the number of birds perching on the Siesta perches was noted separately for those perches that were placed on the slated area and on the litter area. For this reason, the photographs taken on week 20 were analyzed separately from those taken on the other weeks as, there were no Siesta perches on the slated area at week 20 of age. The model for week 20, therefore, included only perch type as a fixed factor and the variables flock and hybrid as random factors. The post-hoc analysis for this model was performed with the Tukey test (Tukey's HSD test).

Due to the low replicate number for each hybrid (i.e., only 1 flock of Hubbard and Gold and 2 flocks of Ross 308) it was not possible to statistically compare the scores of footpad dermatitis between the hybrids. These results are, therefore, presented as descriptive statistics. For the same reason, an analysis of the relationship between the footpad scores and the weight of the birds was performed for each hybrid separately. This was done using a mixed model with weight as a dependent variable and footpad score as a fixed factor. The model for the Ross 308 data also included flock as a random factor.

3. Results

The overall use of perches in the four flocks is presented in Table 2. Average number of birds perching per meter perch across ages were 0.52 birds/m perch, 0.35 birds/m perch, 0.45 birds/m perch for Hubbard, Gold and Ross, respectively.

The overall use of perches across flocks at different ages is presented in Table 3.

Table 2
Overall perch use (birds/m perch) in the four flocks assessed in photos or videos.

Hybrid	Week of age*	N	Mean	Std Dev	Minimum	Maximum
Photos						
Gold	**20**	5	0.64	0.23	0.33	0.89
Hubbard**		4	0.67	0.27	0.33	1.00
Ross 308		10	0.57	0.28	0.22	1.17
Gold	**30**	6	0.33	0.37	0.00	1.00
Hubbard**		5	0.80	0.89	0.17	2.33
Ross 308		12	0.57	0.69	0.00	2.67
Gold	**40**	6	0.31	0.13	0.17	0.50
Hubbard**		4	0.58	0.52	0.17	1.33
Ross 308		12	0.79	0.73	0.33	2.67
Gold	**50**	6	0.39	0.17	0.17	0.67
Hubbard**		5	0.50	0.17	0.33	0.67
Ross 308		12	0.39	0.23	0.00	0.67
Videos						
Gold	**25**	5	0.23	0.05	0.19	0.31
Hubbard**		4	0.35	0.04	0.29	0.38
Ross 308		10	0.23	0.09	0.11	0.38
Gold	**45**	5	0.21	0.11	0.09	0.35
Hubbard**		4	0.27	0.08	0.19	0.38
Ross 308		10	0.19	0.11	0.06	0.36

**Weeks 25 and 45: data collected from videos. Weeks 20, 30, 40 and 50: data collected from photographs **The Hubbard flock did not receive the wooden perch.

Table 3
Overall perch use (birds/m perch) across all ages and flocks assessed in photos or videos.

Week of age	N	Mean	Std Dev	Minimum	Maximum
Photos					
20	19	0.61	0.25	0.22	1.17
30	23	0.56	0.66	0	2.67
40	23	0.62	0.60	0.17	2.67
50	23	0.41	0.20	0	0.67
Videos					
25	19	0.25	0.09	0.11	0.38
45	19	0.21	0.10	0.06	0.38

At 20 weeks of age, there was a weak tendency for an effect of perch type ($F_{4,14} = 2.54$; $P = 0.09$, Fig. 2a) with the square steel perches being the most used (0.90 birds/m perch) and the wooden perches being the least used by the birds (0.41 birds/m perch).

There was a weak tendency for an interaction effect between perch type and week of age ($F_{10,47} = 1.76$; $P = 0.09$), with more birds perching on the Siesta on the slats at 30 and 40 weeks of age (Fig. 2a). There was an effect of perch type ($F_{5,47} = 9.91$; $P < 0.0001$), with more birds perching on the Siesta perches on the slats (1.6 birds/m perch) compared to all other types of perches ($P < 0.003$) (Fig. 2a). There was, however, no general effect of age on perch use in the flocks ($F_{2,47} = 1.60$; $P = 0.21$) (Fig. 2a).

Regarding the data collected from video recordings at 25 and 45 weeks of age, there was a weak tendency for an interaction between perch type and week of age on perch use ($F_{4,24} = 4.39$; $P = 0.08$). More birds perched on the Siesta perches (combined Siesta on the slats and in the litter) at 25 weeks of age (0.3 birds/m perch) compared to at 45 weeks of age (0.1 birds/m perch) ($P = 0.0006$) (Fig. 2b). Furthermore, at 45 weeks of age, more birds perched on the square steel perches (0.33 birds/m perch) compared to the Siesta perches (0.11 birds/m perch) ($P = 0.0001$). Finally, there was a tendency for more birds to perch on the square steel perches (0.33 birds/m perch) compared to the plastic

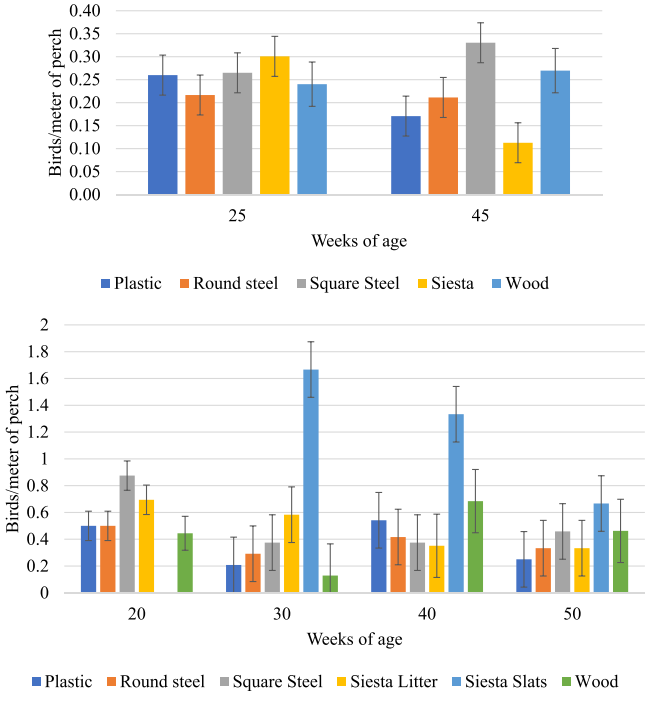

Fig. 2. a. LS means ± SE perch use across perch type and week of age observed from the photographs taken at 20, 30, 40 and 50 weeks of age. The Siesta perch was not placed on the slats before week 30. Fig. 2b. LS means ± SE perch use across perch type and week of age observed from the videos taken at 25 and 45 weeks of age.

perches (0.16 birds/m perch) at 45 weeks of age (P = 0.003) (Fig. 2b).

The average footpad dermatitis scored on 100 hens per flock were 1.42, 1.94, 1.14 and 0.77 (Gold, Hubbard, two Ross 308 flocks) and the percentage of hens within different scores across the hybrids are presented in Fig. 3. Finally, as presented in Fig. 4, there was no relationship between body weight and footpad score in the Ross birds ($F_{4195} = 0.51$; P = 0.73), the Hubbard birds ($F_{3,96} = 0.66$; P = 0.58), or the Gold birds ($F_{3,96} = 1.68$; P = 0.18).

4. Discussion

The aim of this study was to investigate the overall use of perches by commercial broiler breeders at different ages throughout the production period and to investigate preferences for different perch materials. Contrary to previous studies (Gebhardt-Henrich et al., 2017, 2018; Mens and van Emous, 2022), the birds in the present study did not reduce their perching behavior with age. Our results correspond with the study by Brandes et al. (2020), where broiler breeders (Ross 308/708 and Ross Ranger) used all types of perches throughout the production period. The lack of age effect in the present study may partly be caused an overall low perch use in the flocks. The average perch use in the present study was only 0.44 birds/m perch which is a capacity utilization of less than 10 %. Each flock only had access to 33 m of perch in total, which is likely far too little to accommodate the potential perch motivation in the birds. Future studies must include enough perch to allow all birds to perch at the same time.

Use of perches by laying hens are known to be affected by the presence of perches in rearing (Gunnarson et al., 2000), and we do not know whether the breeders in the present study had access to perches during the pullet period. We observed perching behavior during the light period, albeit in the hour preceding dusk in the present study. The number of birds perching could potentially be higher when the light is turned off, as Brandes et al. (2020) found large differences in perching in the light and dark period (2.07 birds/m vs. 0.73 birds/m perch). But even during the dark period, the perch capacity utilization in Brandes et al. (2020) was 40 %, meaning that most of the birds preferred to rest on the elevated slats rather than available perches. Similar results are reported by Gebhardt-Henrich et al. (2017), who found that more broiler breeders (Ross 308) perched when suffcient space on a perch was offered, but perch use was never above 50 %. Furthermore, Gebhardt-Henrich et al. (2018) observed that between 35 % and 70 % of fast- and slow-growing breeders (Ross 308 and Sasso) used the available perches. Mens and van Emous (2022) observed perching in broiler breeders and found that a majority of birds perched on the wooden slats, followed by the plastic perches (both were placed 50 cm above the litter). A preference for slats over perches has also been found in both fast-growing and slow-growing broiler chickens (Norring et al., 2016; Malchow et al., 2019). The fact that platforms where the birds cannot grip around a perch seems to be preferred over perches by both fast and slow growing breeders is interesting and warrants further investigation.

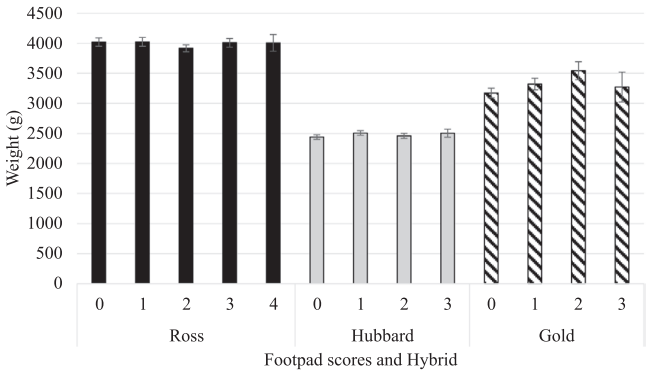

Fig. 4. End of lay body weight (LS Mean ± SE) across footpad dermatitis scores for the flocks of Ross 308 (n = 2), Hubbard (n = 1) and Gold (n = 2).

At 20 weeks of age, before one of the Siesta perches were placed on the slats, the most popular perch type across the flocks was the steel square perch. This is interesting, as this was the only perch that did not allow the birds' feet to completely grip around it. The clearance height between the perch and the surface has previously been found to increase the use of the perch (Brandes et al., 2020). The square steel perch was slightly wider (4 cm) compared to the other three perch types (3.3 – 3.8 cm), and studies in laying hens show that the birds have a preference for flat and wide perches (<4 cm) (Struelens and Tuyttens, 2009; Pickel et al., 2010; Skånberg et al., 2021) over round and narrow perches. At 30 weeks of age, one of the Siesta perches was placed on the elevated slats at week 30 based on suggestions from the farmers. From this point, the Siesta on the slats was the most popular perch in all four flocks for the rest of the production period, with on average 1.7, 1.3 and 0.7 birds/m perch in weeks 30, 40 and 50, respectively. There may be several reasons for this. First, the Siesta perch was higher (15 cm) then the other four perches (5 cm) on the slats, and the height of the perch is known to be an important factor for perch preferences (Schrader and Müller, 2009; Brendler et al., 2014). In addition, the Siesta perch was wider (8 cm)

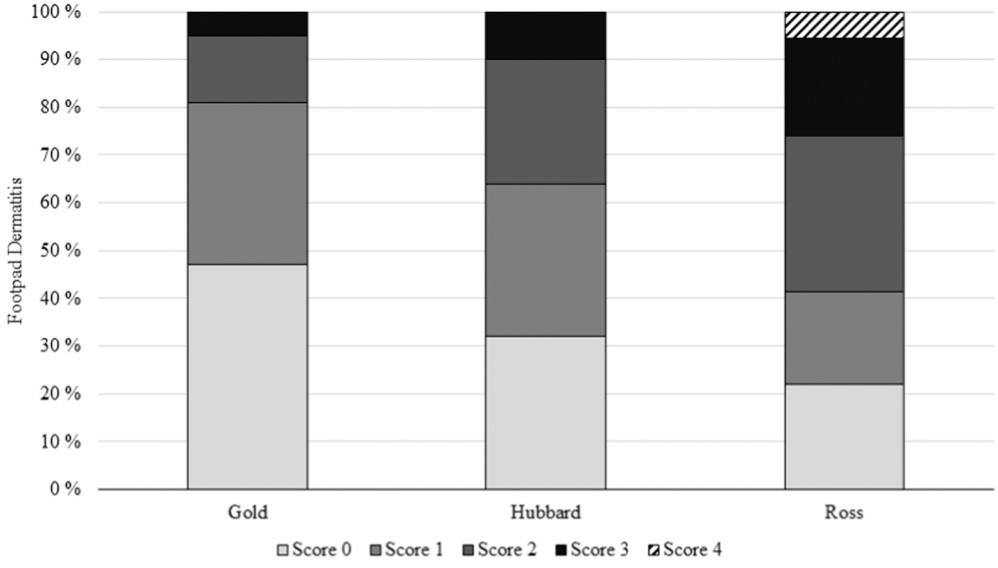

Fig. 3. Percentage distribution of footpad dermatitis scores across the three hybrids (Gold n = 1, Hubbard n = 1, Ross n = 2) during the health visit at end of lay.

than the other perch types (3–4 cm wide), giving it an added quality. The novel effect could also increase the use, at least during the first few days after placement.

There were too few flocks in the present study to investigate effects of hybrid on perching behavior. Despite relatively large differences in body weight at end of lay (Hubbard: 2 472 g, Gold: 3 280 g, Ross 308: 4 080 g) there were no significant differences between the three hybrids with regards to average number of birds perching per meter perch across ages (Hubbard: 0.52 birds/m perch, Gold: 0.35 birds/m perch, Ross 308: 0.45 birds/m perch). However, numerically, the lighter Hubbard perched more, and future studies should include more flocks per hybrid to investigate this further. Vasdal et al. (2022) found that Hubbard pullets perched significantly more than Ross 308 pullets, and increased perch behavior in adult slower growing hybrids are also reported by Gebhardt-Henrich et al. (2018). On the other hand, Brandes et al. (2020) compared perch use in the slower growing Ross Ranger and the fast growing hybrids Ross 308 and Ross 708 and found similar perch use in all hybrids during the dark period.

Previous papers on perching in broiler breeders tend to focus on the hens' perching behavior (e.g. Mens and van Emous, 2022), or do not differenciate between perching behavior in hens and roosters (e.g. Brandes et al., 2020). In the present study, we recorded number of birds on the perches, and did not differenciate between sexes. However, when looking at the pictures and videos, we hardly saw any roosters on the perches. Studies on roosters' use of the area in commercial breeder houses show that the males tend to spend their time in the littered area, while females tend to favor the raised slatted area (Leone and Estevez, 2008). This was also observed in the current study; the roosters tended to stay down in the littered area. However, the roosters motivation to perch should be investigated further.

The footpad health in the hens was generally good in the four flocks, but with some numerical differences between the hybrids. The heaviest hybrid had the highest average score, but the lowest score was found on the medium sized hens (Gold, 3 200 g). Indeed, the results from the present study suggest no relationship between footpad score and body weight, which is contrary to Gebhardt-Henrich et al. (2017), who found more footpad dermatitis (FPD) in heavier birds. FPD in broilers has previously been linked with increaed live weight (Kjaer et al., 2006) and wet litter (e.g. de Jong et al., 2014). Only a few studies have focused on FPD in broiler breeders, and they report an increase in FPD with age (Thøfner et al., 2019), with between 34 % (van der Oever et al., 2020) and 64 % of the birds having severe lesions (Kaukonen et al., 2016). van der Oever et al. (2020) found a significant relationship between FPD and wet litter, while Kaukonen et al. (2016) did not find an effect of poor litter quality on FPD. In these three studies, only information from the hens' feet are reported. The FPD scores in the present study, based on scoring of hen feets, were lower than these previous studies and relatively few birds were scored with severe lesions (3 and 4) at the end of the production period. The presence of perches is reported to reduce footpad dermatitis in broiler breeders (Gebhardt-Henrich et al., 2017), but with only 33 m perch length for the entire flock, the presence of perches is not likely a part of this explanation. More controlled studies in commercial broiler breeders with and without acces to perches shold investigate any potential effects of perches on FPD. Furthermore, scoring of the roosters' FPD should be included in future studies.

There were some important limitations in this study that should be addressed in future studies. As this was a field study, we could only include a limited sample size. In future studies, a higher number of flocks within each hybrid would provide more robust results to confirm the present findings. Perching behavior during both the light and dark period should be included to investigate if the perches are increasingly used during the dark period. Furthermore, due to travel restrictions related to the Covid-19 pandemic, the pictures were taken by the farmers, and each flock could only receive a limited number of visits from the scientists with video camera. Finally, as the flocks could not be divided into different groups within the house, the lack of control group limited the possibility to investigate effects of perches on health and production parameters.

In conclusion, the birds in the present study used the perches consistently during the production period. The average perch use in the present study was only 0.44 birds/m perch which is a capacity utilization of less than 10 %. The Siesta perch on the elevated slats was the most popular perch in all four flocks at all ages, possibly due to its height. Broiler breeders use perches, but the design and placement of the perches must be considered carefully. Finally, there was no observed relationship between body weight and footpad scores.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgment

This work was supported by the Foundation for Research Levy on Agricultural Products (FFL/JA), nr. 317322. The authors also want to thank all the participating farmers for assembling the perches, taking pictures and allowing us to observe their birds.

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