FRIEDRICH-LOEFFLER-INSTITUT
FLI
Bundesforschungsinstitut für Tiergesundheit
Federal Research Institute for Animal Health

Challenges and Opportunities: Findings of a German survey study on colony and aviary systems

FRIEDRICH-LOEFFLER-INSTITUT (FLI)
Federal Research Institute
for Animal Health

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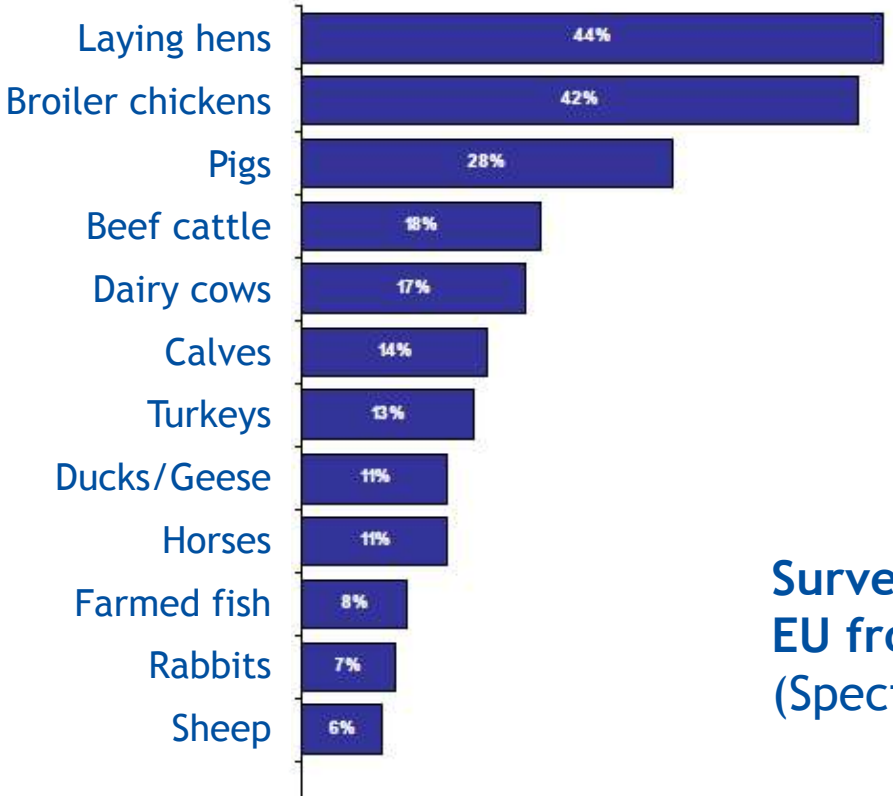
Welfare of laying hens is an important public concern in the EU…

For which three farm animals should the current level of welfare be improved the most?



Survey with 28,652 citizens of the EU from 29 member states
(Special Eurobarometer 270, 2007)

… and in particular in Germany

German actress Katie Pfleghar in front of the German Federal Ministry of Food and Agriculture (2008)

Source: Sean Gallup/Getty Images News

Past and present challenges in Germany

- Ban of battery cages from *2009*
- Legal regulation for the “colony system” (DE enriched cage) repealed by the Federal Constitutional Court due to a formal mistake in *2010*
- “Voluntary” abandonment of beak trimming from *2017*
- Ban of colony systems from *2025*

“Deriving management recommendations for housing of laying hens in colony systems under conditions of practice in comparison to aviary systems” (2010 – 2013)

Thünen-Institute
University of Veterinary Medicine Hannover
University of Hohenheim
University of Kassel
Saxon State Institute of Agriculture

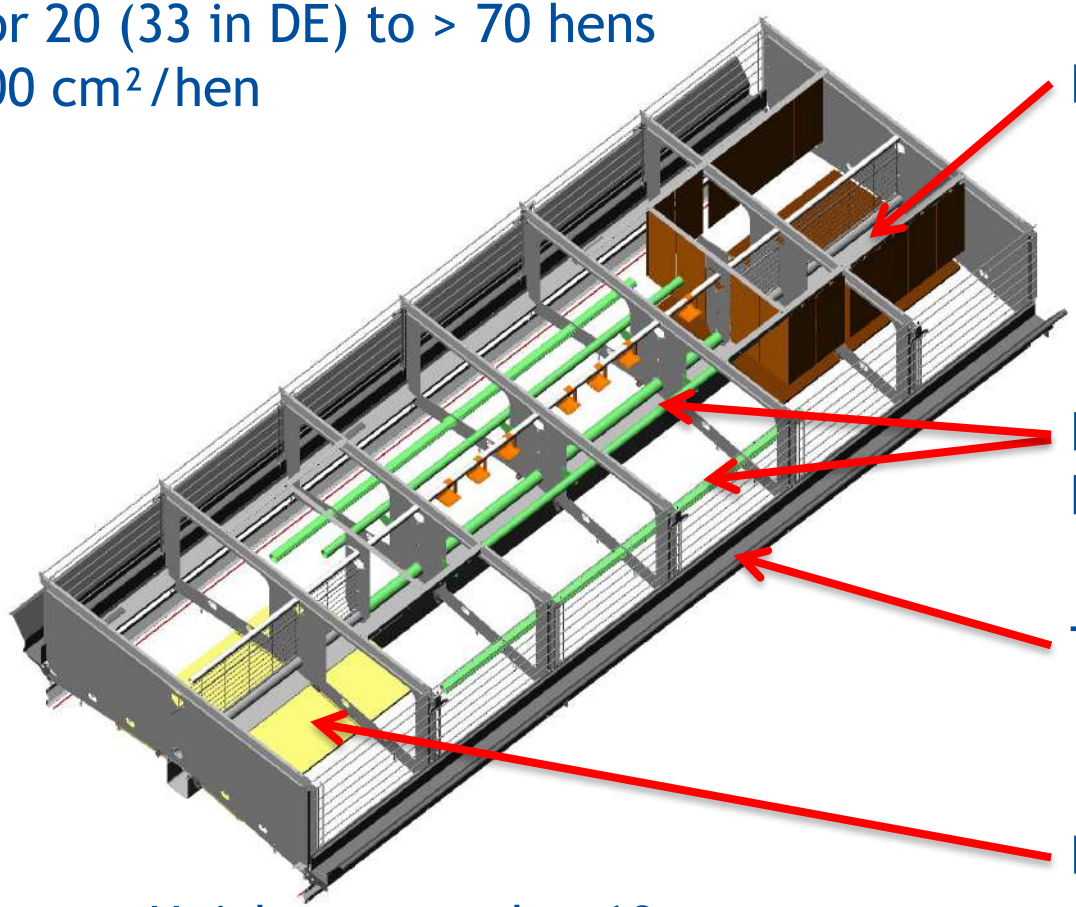
Colony systems 19 farms
Aviary system 47 farms

Data recording during last third of laying period (48-78 week of life)

Financed by the German Federal Ministry of Food and Agriculture

Colony systems at a glance (DE version)

For 20 (33 in DE) to > 70 hens
800 cm²/hen



Nest (+ 90 cm²/hen)

Perches (at two different heights, 15 cm/hen)

Trough (12 cm/hen)

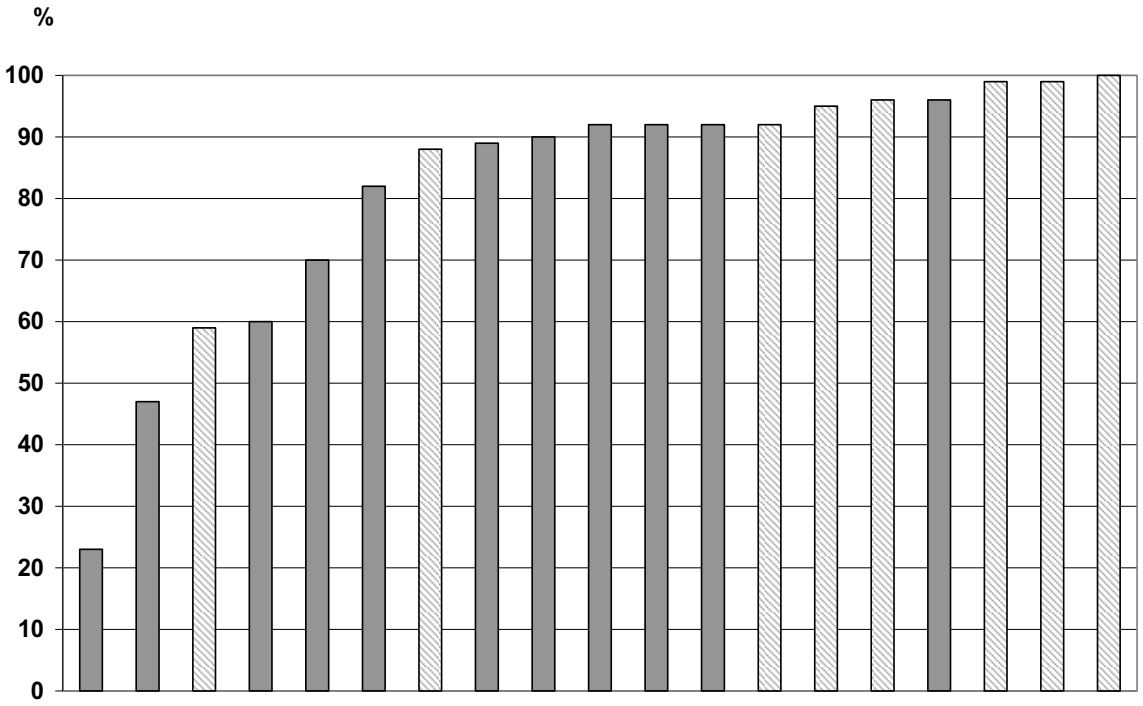
Litter area (90 cm²/hen)

Height at trough ≥ 60 cm
(lowest height ≥ 50 cm)

Colony systems at a glance (DE version)

Colony systems

Hens with at least one featherless area in plumage

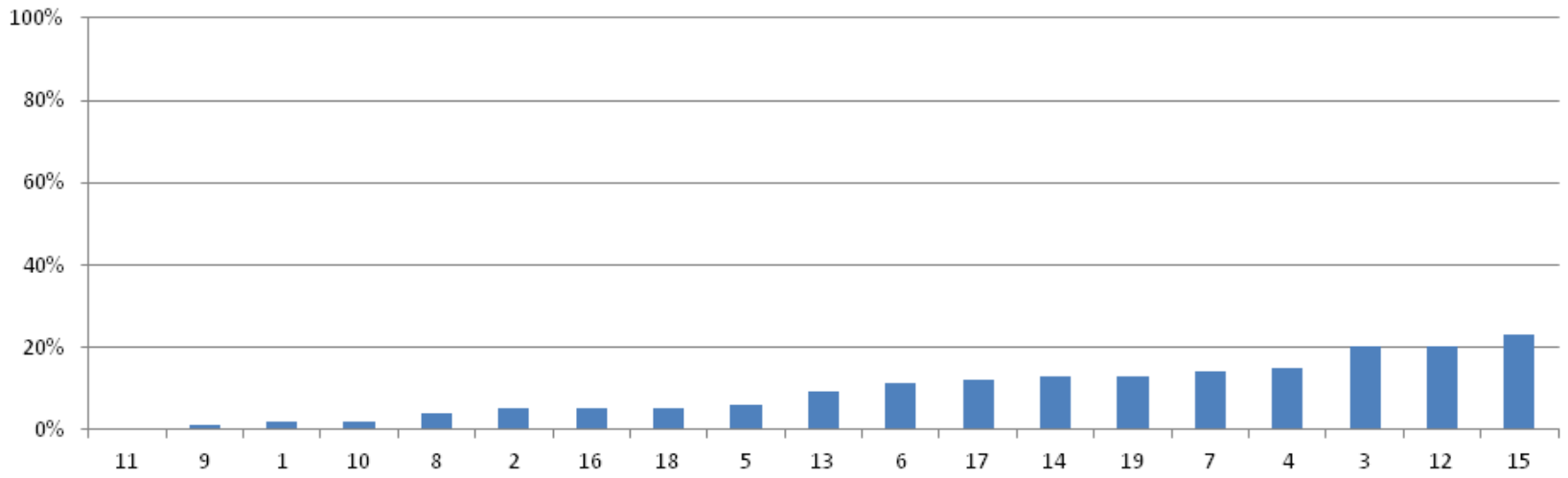


dark columns: beak-trimmed flocks

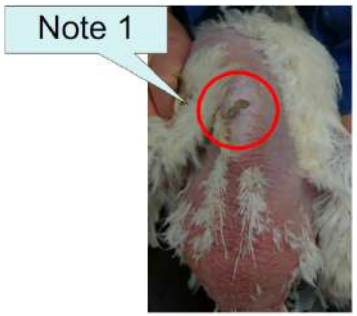
Mean: 82 %

Colony systems

Hens with skin lesions

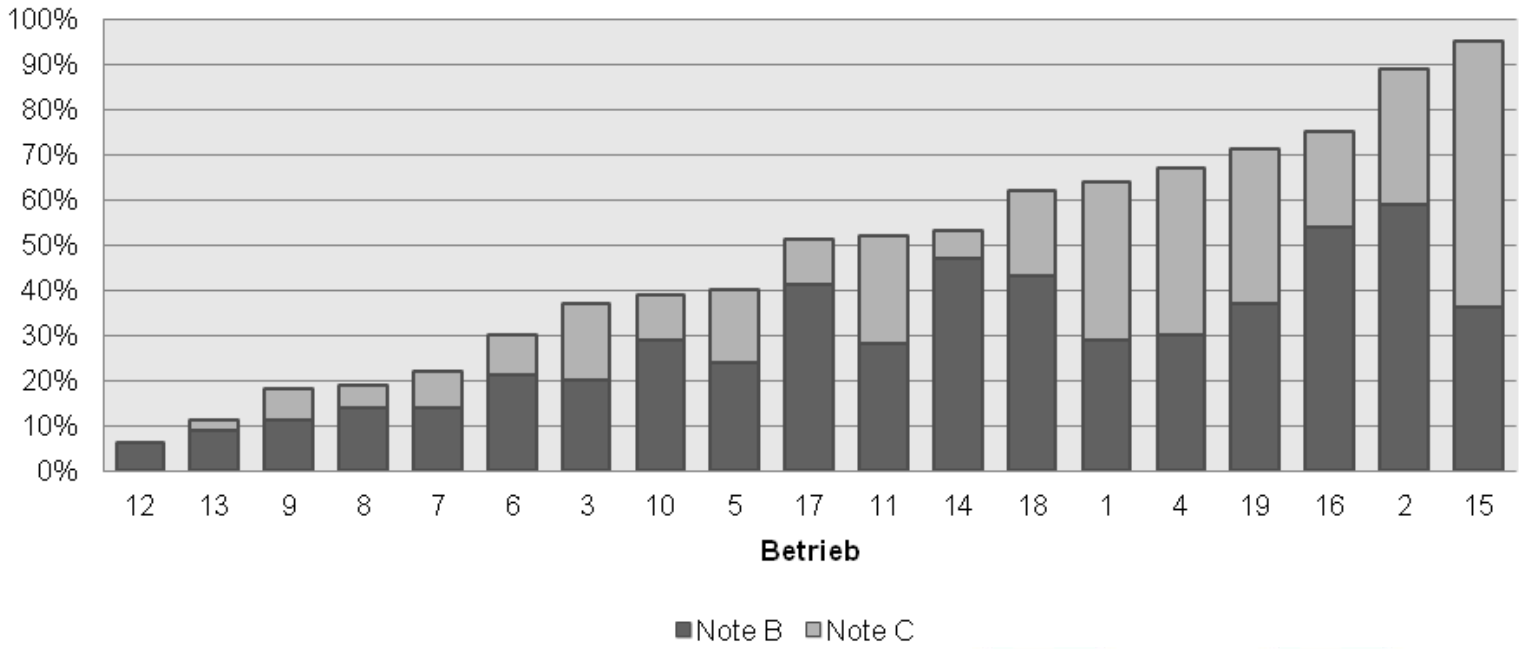


Mean: 13 %



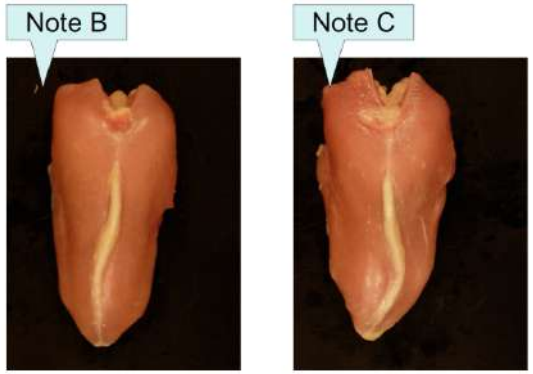
Colony systems

Hens with keel bone damages



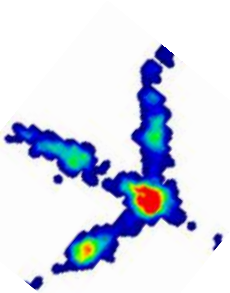
Note B: slight deformation
Note C: severe deformation and/or fracture

Mean: 52 %



Colony systems

Hens with keel bone damages



Item	Perch shape[1]		
	Round	Oval	Square
Sitting hens			
Keel bone			
Peak force (N/cm^2)	6.02^a (5.90; 6.12)	6.12^a (6.00; 6.24)	5.77^b (5.62; 5.92)
Single foot pad			
Peak force (N/cm^2)	1.29^a (1.19; 1.39)	1.08^b (1.01; 1.17)	1.26^a (1.15; 1.39)

Pickel et al. (2011)

Hens are sitting on their keel bones!

Use of litter area

At daytime: 12 % of hens in the litter area
8.9 % of time pecking, 4.5 % dustbathing, 0.4 % scratching

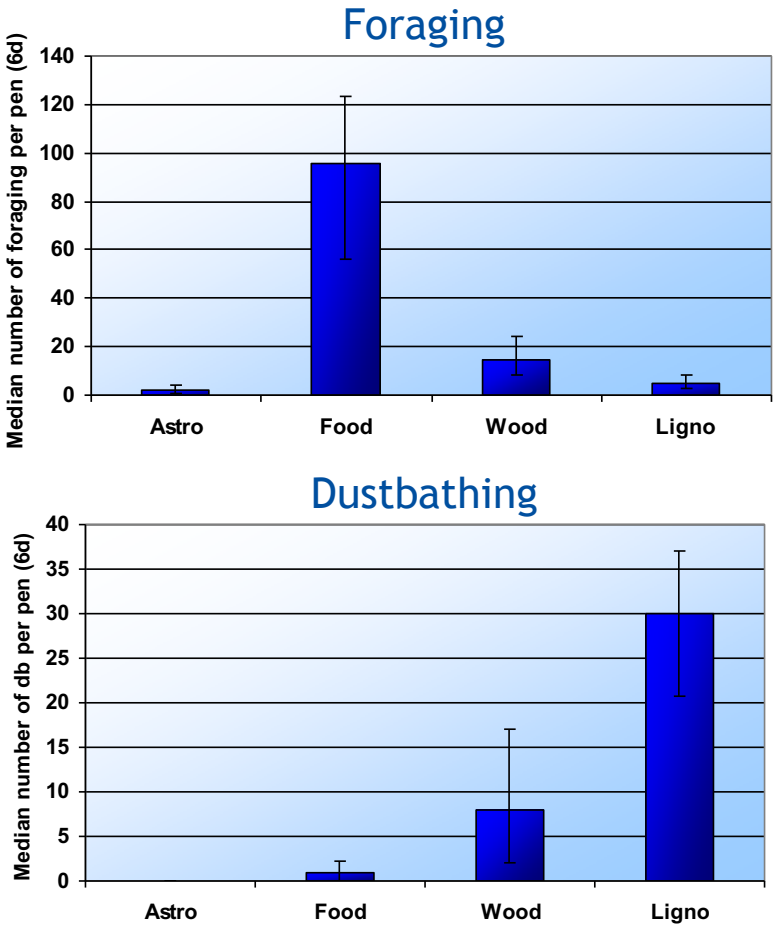
Food as substrate for dustbathing

Colony systems

Use of litter area

Preference test

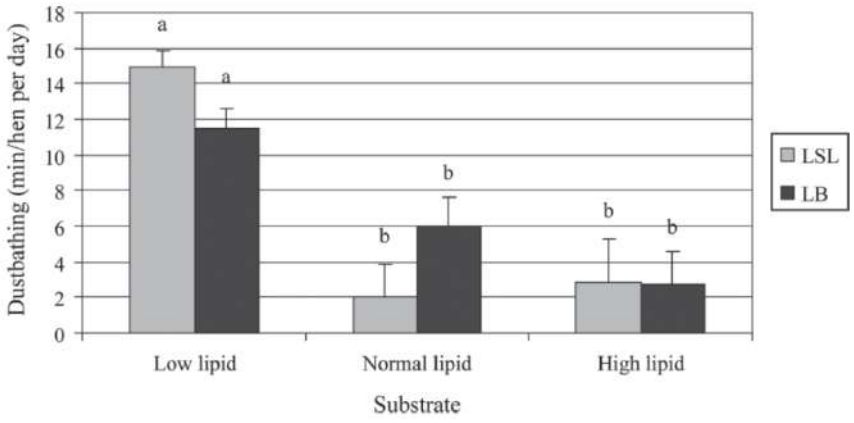
Scholz et al. (2010)



Use of litter area

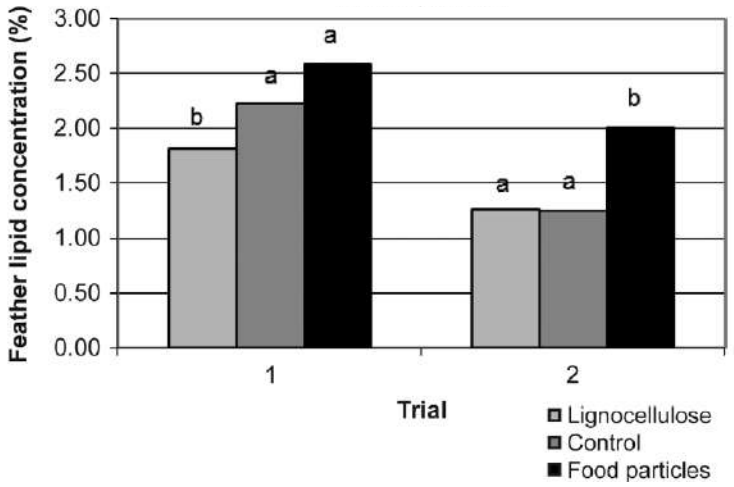
Preference test with food of different lipid contents

Dustbathing



Scholz et al. (2011)

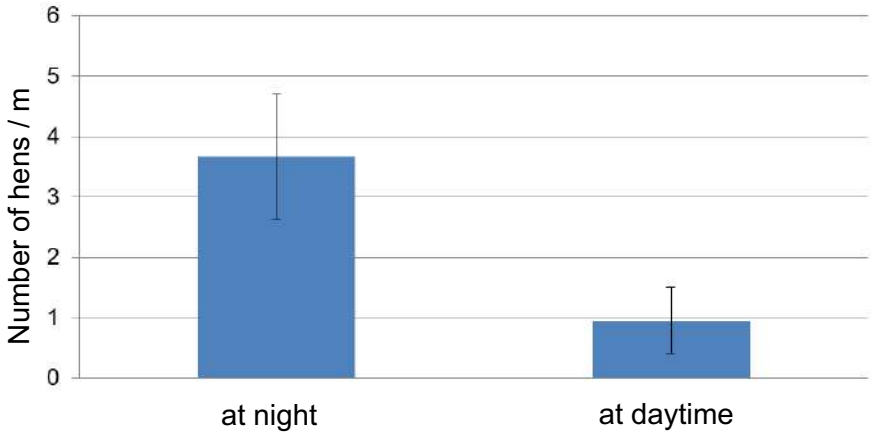
Feather lipid concentration



Scholz et al. (2014)

Colony systems

Use of perches

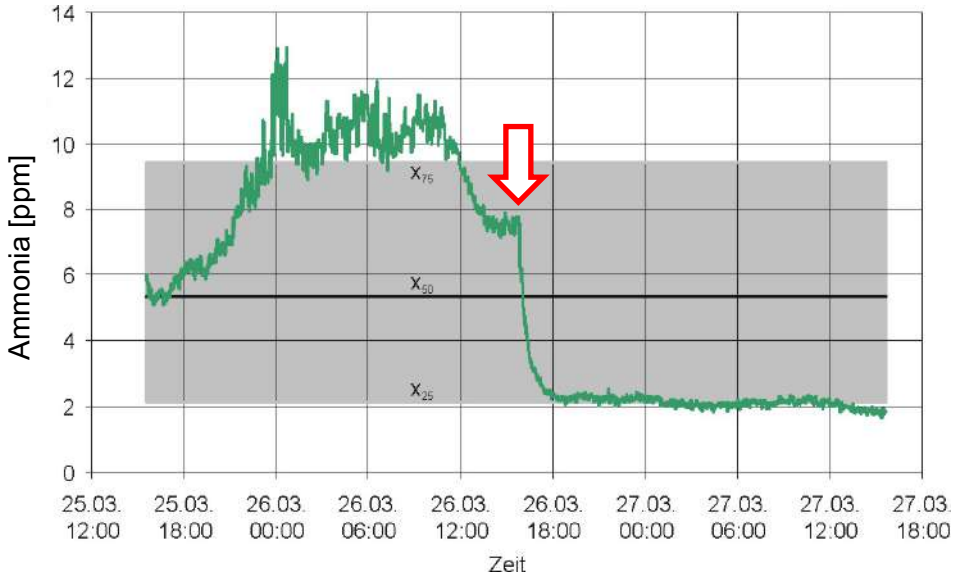


At night more hens (4 hens/m) on low than on high perches (3 hens/m)

Colony systems

Emissions

Low emissions [mg/(h*hen)]: Ø 2.65 NH_3, 0.49 PM10, 0.10 PM2.5



clear effects of running of the manure belt on NH_3

Colony systems

Production measures

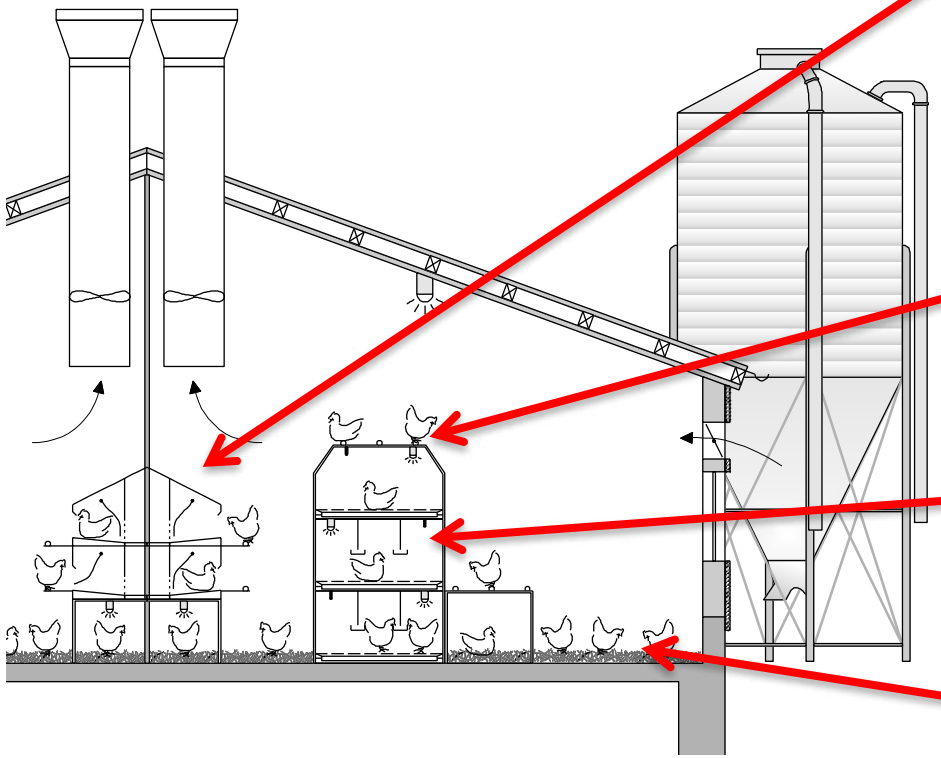
	initial number of hens	< 3.000	3.000-10.000	10.000-30.000	30.000-100.000
Number of farms		6	5	4	3
Age at arrival	weeks	19,83	19,60	18,20	17,67
Age at 50 % laying performance	weeks	23,33	22,00	22,45	20,83
Laying performance	eggs/hen/year	256,56	273,64	291,05	316,77
Mortality	% / laying period	8,62	6,53	5,84	6,49
Feed consumption	g / egg	153	153	144	128

Colony systems – summary

- High prevalence of plumage losses due to feather pecking and abrasion by technical equipment
- High prevalence of skin injuries
- High prevalence of keel bone damages (due to metal perches?)
- Less suitable litter area (e.g. food as material); 1 larger better than a number of smaller litter areas; litter area should be brighter than rest of system
- Perches less attractive for the hens; at daytime perches are obstacles (remove at daytime?)
- 2 smaller nests are better than 1 large nest with respect to agonistic behavior between hens (data not shown)
- Low air pollution (emissions)
- High management effort is required (higher than with battery cages)

Aviary systems at a glance

For < 6.000 hens per group
Total space 9 hens/m² (= 1111 cm²/hen)



Nest 120 hens/m²
(= 83 cm²/hen)

Perches (15 cm/hen)

Trough (10 cm/hen)

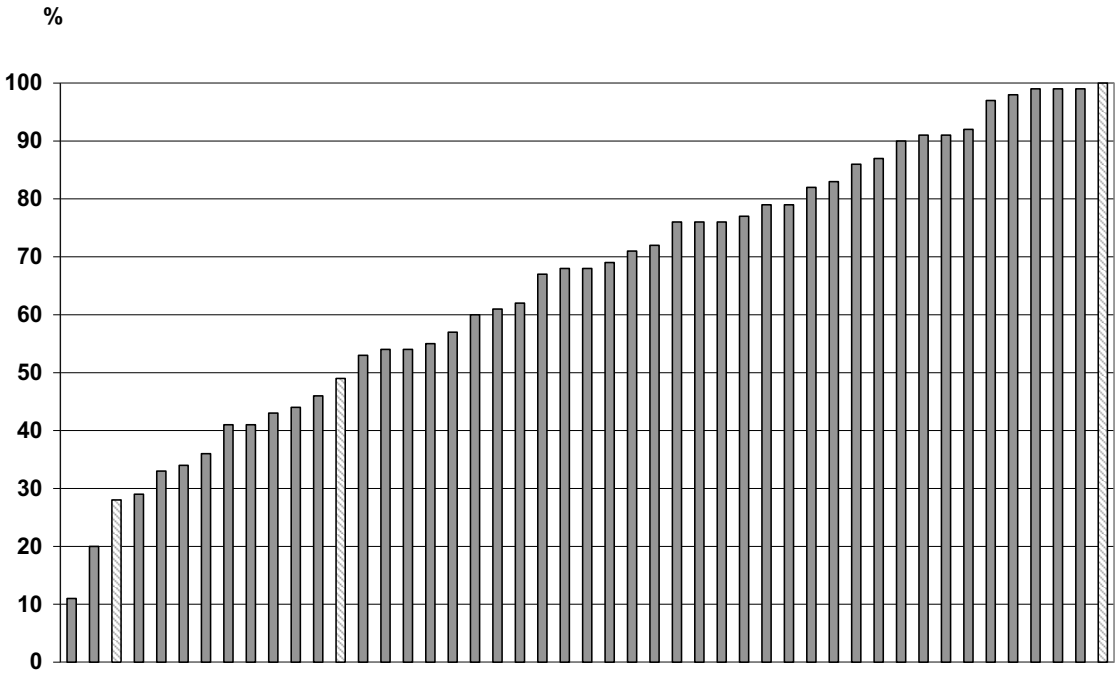
Litter area (250 cm²/hen)

Height between tiers ≥ 45 cm

Aviary systems at a glance

Aviary systems

Hens with at least one featherless area in plumage

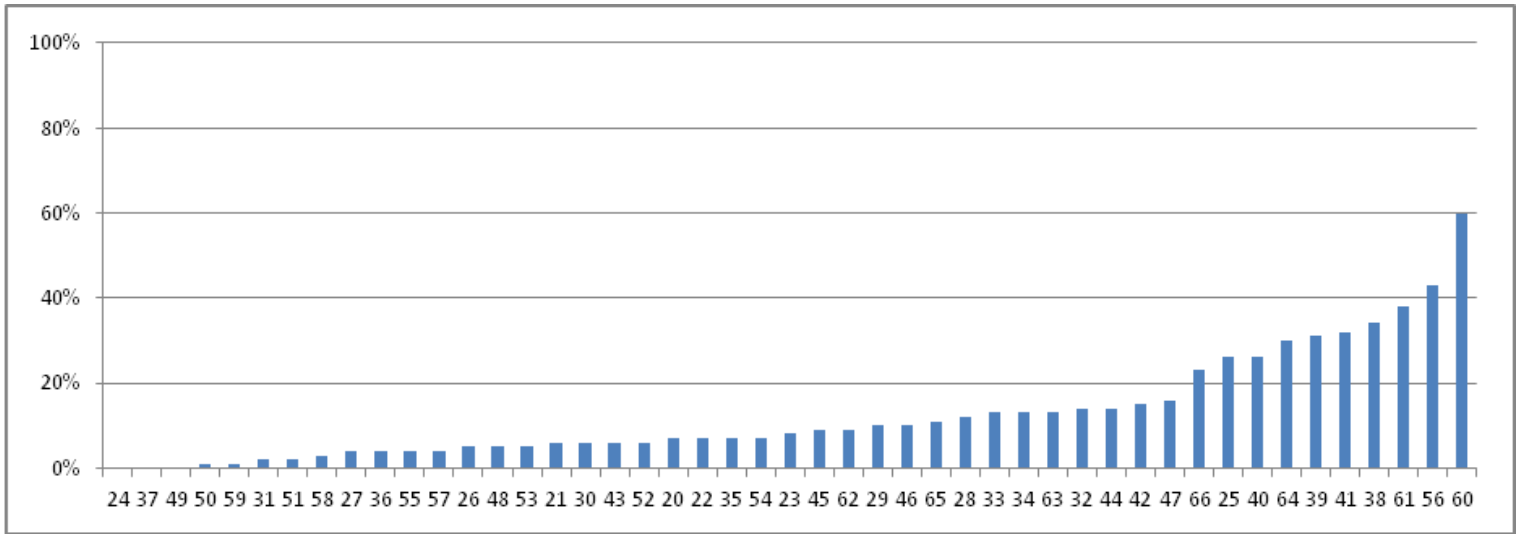


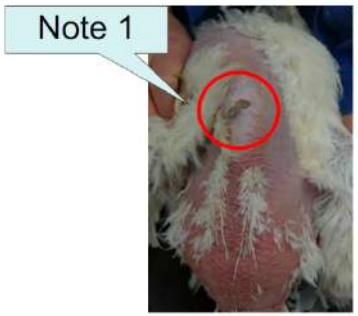
dark columns: beak-trimmed flocks

Mean: 66 %

Aviary systems

Hens with skin lesions

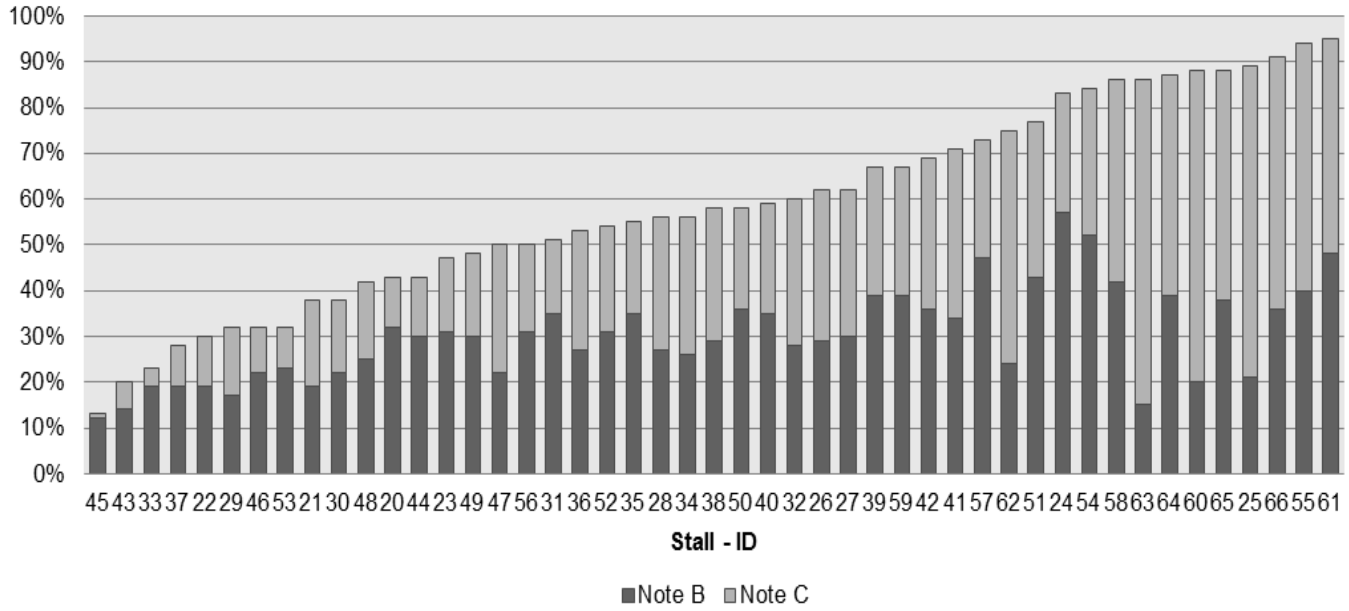




Mean: 13 %

Aviary systems

Hens with keel bone damages



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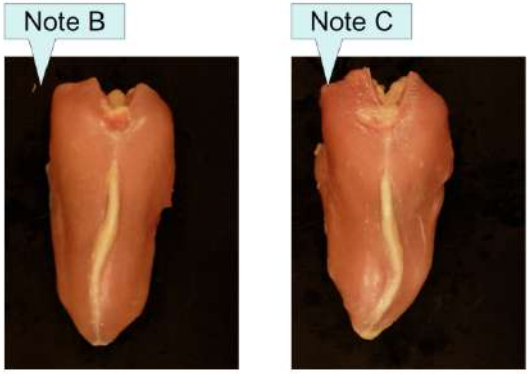
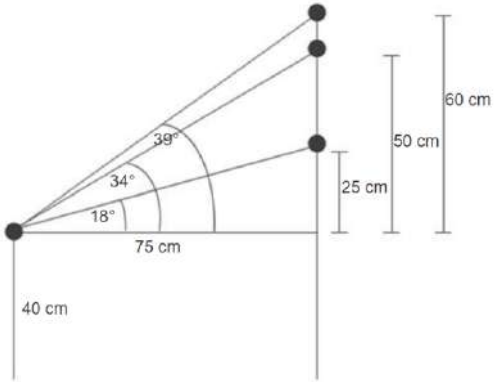


Mean: 41 %

Aviary systems

Hens with keel bone damage



Steel perch

Soft perch

Scholz et al. (2014)

Aviary systems

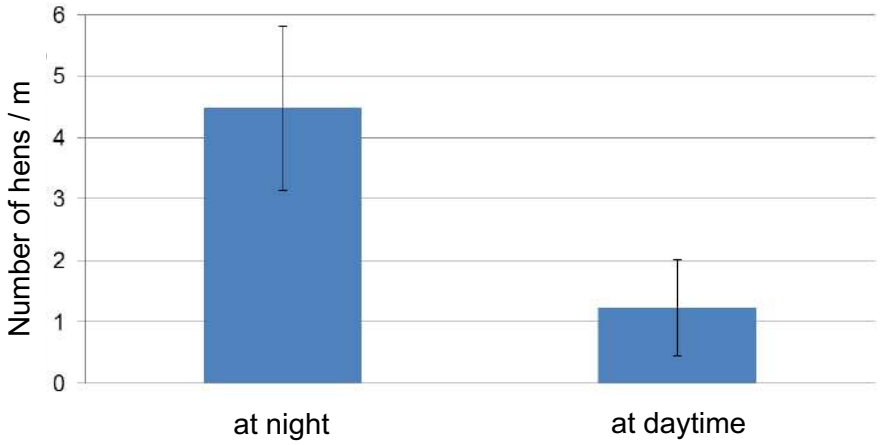
Hens with keel bone damages

Aviary systems

Use of litter area

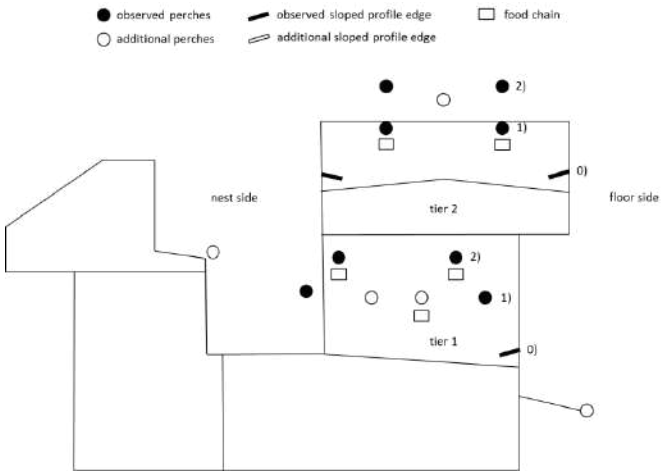
At daytime: about 7 hens/m² in the litter area
27.7 % of time pecking, 5.6 % dustbathing, 1.9 % scratching

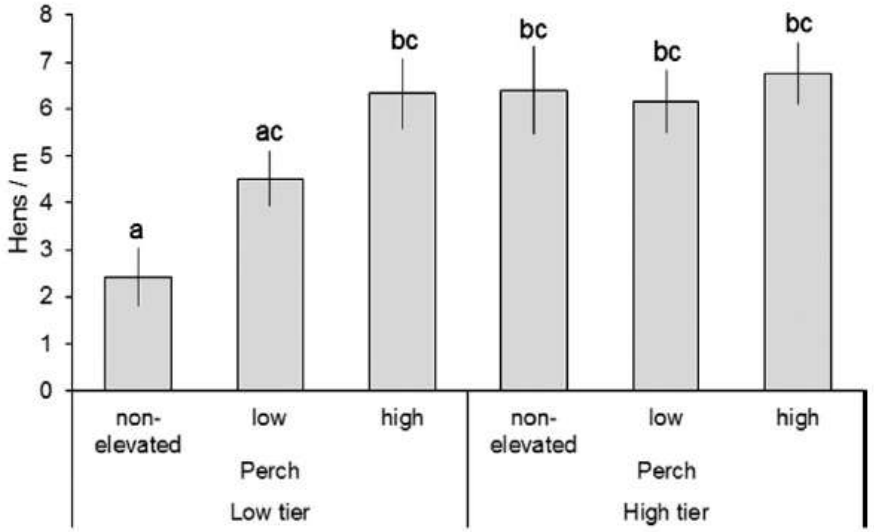
Use of perches



Aviary systems

Use of perches at night





Brendler & Schrader (2016)

Perches on high tiers and high perches within low tiers are preferred

Aviary systems

Emissions

Moderate to high emissions [Ø mg/(h*hen)]:

17.77	NH_3
4.37	PM10
0.88	PM2.5

Aviary systems

Production measures

Untersuchte Herde	initial number of hens	< 3.000	3.000-10.000	10.000-20.000	20.000-30.000
Number of farms		11	16	14	5
Age at arrival	weeks	18,09	17,48	18,30	17,52
Age at 50 % laying performance	weeks	22,14	20,19	21,51	21,62
Laying performance	eggs/hen/year	254,92	279,31	291,10	290,32
Mortality	% / laying period	10,04	11,59	9,82	10,06
Feed consumption	g / egg	160	151	139	136

Aviary systems – summary

- High prevalence of plumage losses due to feather pecking
- High prevalence of skin injuries
- High prevalence of keel bone damages (due to metal perches: collisions, slippery surface?); ramps should be offered; a dusk phase (> 45 min) is recommended to reduce keel bone damages
- Sometimes less suitable litter material (faeces and dust); sometimes not enough litter material; light in litter area should be brighter (increases attractiveness for foraging and reduces risk for floor eggs)
- Perches should preferentially be offered on the high tiers; within low tiers also elevated perches should be offered; round metal perches are least recommended

Aviary systems – summary

- Nest area should be larger then 1 m^2 for 120 hens in particular for white layers (shorter laying phase)
- Higher air pollution (emissions) compared to colony system
- High management effort is required (higher than with battery cages)
- Hens should be reared in aviary systems and should change to laying stable early (to learn food, water, nests, tiers, …)

Conclusions

- Feather pecking and keel bone damages prevalent in both systems
- Possibilities (and needs) for improvements in both systems
- Better preconditions for high animal welfare in aviary systems
- High variation between farms suggests a significant impact of management skills
- Management effort:
  battery cage < colony system < aviary system
- Public perception of colony systems: “a cage is a cage”

Thank you for your attention!