Foot pad health and mortality as part of 'Controlling' in commercial Turkey production

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Background

Monitoring

- Collect data
- Parameters
  - Measurable
  - Several parameters linked to/ sustain one indicator

Controlling

- Collect and evaluate data … of the current flock
- Parameters and Indicators
  - … detect a critical situation in time
  - … Signals: risk? no risk? measures required?

Background

- Application of animal-welfare related indicators
  - demanded by German Animal Protection Act §11, 8 (2013)

➢ Few indicators
  - early stage information
  - act in time… prospectively
  - time frames

Aims of the study

- Identify **time frames of risk for mortality and foot pad health**
  - Under consideration of season, sex, age

- Both parameters indicate deviation from target value premature

- Suitability as indicators for animal health and welfare according to on-farm controlling

Animals, Material and Methods

Animals, Material and Methods

Farms

- One year period
  - Summer and winter cycle
- 13 Farms
  - Different number of flocks per farm
- B 85,000 and @18,500 per cycle
- Genotypes: B.U.T. 6, B.U.T. 7, B.U.T. TP 7

Animals, Material and Methods

Data collection

Mortality

- Farm record (2x daily, number, death or culled)

Animals, Material and Methods

Data collection

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Foot pad health

- Macroscopic scoring
  - 5-Point scale, according to Hocking et al. 2008
- 60 animals/ flock
  - Cleaned right and left foot pad per animal, about 11,400 pairs
- 1., 4., 8., 12., 16. week of life (B and @ and p.m. (B)
- Data about litter management, e.g. material, quantity, dispersing frequency

Animals, Material and Methods

Statistical analysis

Mortality

@and B rearing: time frames of risk

- Correlation between various points of time
- Twotail Spearman correlation

B fattening: time frames of risk

- Merging of weekly mortality data of all flocks
- Results were calculated in 1st, 2nd,3rd and 4th quartile

Animals, Material and Methods

Statistical analysis

Foot pad health (FPD)

Influence of litter management

- stepwise multiple regression analysis (SPSS Vs.23)
- $y_{1,2} = ß_0 + ß_1 * x_1 + ß_2 * x_2 + ß_3 * x_3 + ß_4 * x_4 + ß_5 * x_5$

  - **y_1 = FPD 16th week of life**
  - **y_2 = FPD 20th week of life**

  - X_1 = litter dispersing interval during fattening (0-1, 2-3, 4-6 times/ week)
  - x_2 = time of starting litter dispering in fattening period (5., 7.-8. or 11. week of life)
  - x_3 = litter amount rearing period (0.8-3.8, 3.9-5.9, 6.0-8.4 kg/m²)
  - x_4 = litter amount fattening period (0-8, 8.1-16, 16.1-24 kg/m²)
  - x_5 = litter material (straw pellet, wood shaving, straw)

- U-test FPD 16th week of life
  in winter cycle 2 categories of litter dispersing interval during fattening (2-3, 4-6 times/ week)

Results and Discussion

Results and Discussion

Mortality - rearing period

		Female		Male	
		winter	summer	winter	summer
n (animals/ no. flocks)		21,800/4	17,500/3	86,600/16	82,100/14
7-day Mortality (%, cumulative)	Mean (SD)	0.8 (±0.2)	1.2 (±0.9)	0.8 (±0.3)	1.3 (±1.0)
	Median	0.90	1.20	0.70	1.00
1.-35. day of life (%, cumulative)	Mean (SD)	1.9 (±0.5)	1.8 (±1.0)	1.8 (±1.5)	3.3 (±1.5)
	Median	2.10	1.80	1.80	1.80

- Influence of age and season
- After first week adapt management measures

- Hatchery?
- Housing conditions?

Results and Discussion

Mortality - fattening period

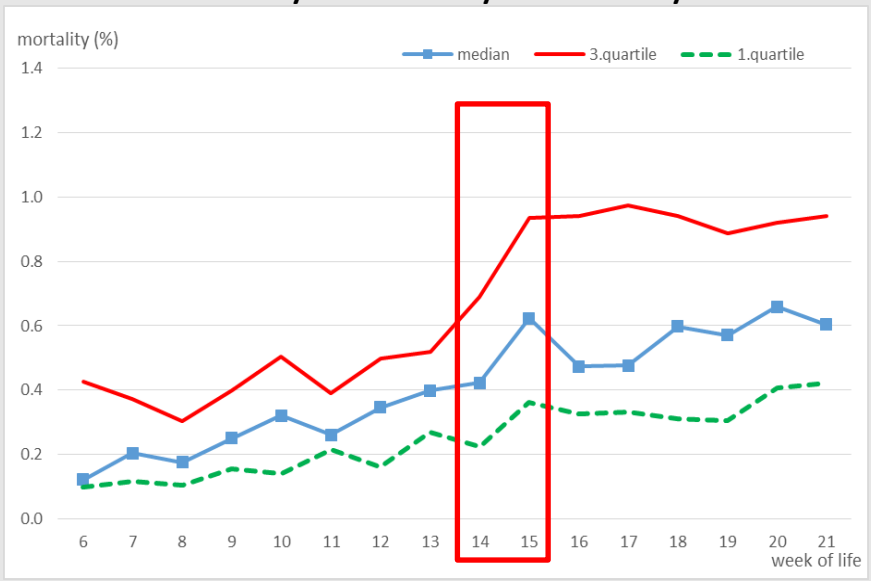
		Female		Male	
		winter	summer	winter	summer
n (animals/ no. flocks)		21,800/4	17,500/3	86,600/16	82,100/14
6.-16./21. week of life (%, average per week)	Mean (SD)	0.23 (±0.1)	0.24 (±0.5)	0.49 (±0.4)	0.51 (±0.4)
	Median	0.19	0.16	0.38	0.43

- Influenced by
  - sex (RUDOLF 2008, CLARK and BAILEY 2014)
  - season (RUDOLF 2008, KRAUTWALD-JUNGHANNS and FEHLHABER 2009, DAMME 2015)

Results and Discussion

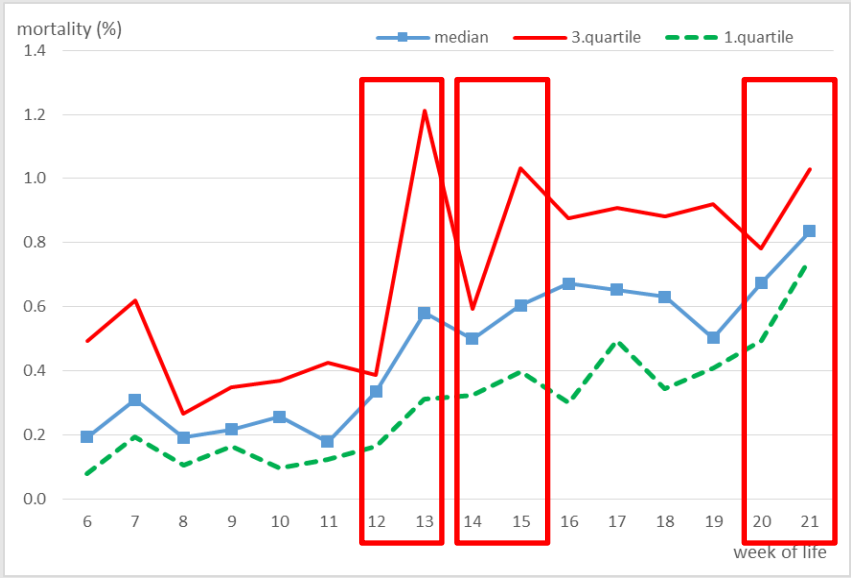
♂ Mortality - fattening period

% weekly mortality winter cycle



n=16 flocks

% weekly mortality summer cycle



n=14 flocks

- Influence of age and season
- Heatstress?
- Vaccination?
- Onset of puberty?

Results and Discussion

Foot pad health – Score 0-4

Week of life	Female			Male		
		winter	summer		winter	summer
1	n	220	180	n	661	720
	Median	**0.75[a]**	**0.00 [b]**	**Median**	**0.73[a]**	**0.16[b]**
4	n	240	180	n	839	840
	Median	**0.55[a]**	**0.42[b]**	**Median**	**0.84[a]**	**0.60[a]**
8	n	240	180	n	873	1140
	Median	**1.91[a]**	**1.62[b]**	**Median**	**1.68[a]**	**1.34[b]**
12	n	240	180	n	1050	1040
	Median	**2.31[a]**	**1.90[b]**	**Median**	**1.75[a]**	**1.60[b]**
16	n	240	120	n	1090	1080
	Median	**2.26[a]**	**2.32[a]**	**Median**	**2.29[a]**	**1.86[b]**
p.m.	no evaluation			n	840	1173
				Median	**2.35[a]**	**2.16[b]**

[a,b]: different superscripts (within a row and sex) indicate significant differences; $p<0.05$ (Mann-Whitney U-test)

Results and Discussion

Foot pad health – Score 0-4

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- Influenced by season, sex and age (KRAUTWALD-JUNGHANNS et al. 2011; BERGMANN et al. 2013)

- Time frame of risk -> rearing period (4th to 8th week of life)
  (HUCHLER et al. 2016, BERGMANN et al. 2013, KRAUTWALD-JUNGHANNS et al. 2011)

Results and Discussion

Foot pad health

FPD and litter management

(male, winter)

- **FPD 20th week of life** = 1.505 + 0.052* **litter amount fattening period**, p<0.01
- **FPD 16th week of life**= 0.420 + 0.766* **fattening litter dispersing interval**, p<0.001

2-3 times per week → 11.2 -14.2 kg straw/m² → FPD Score 2.2 (Median)

4-6 times per week → 17.5 to 22.6 kg straw/m² → FPD Score 2.6 (Median)

U-test: U=0.000, p< 0.001

cf. EKSTRAND et al. 1997

Conclusion

- Evaluation of a farm requires data from more than one flock

Mortality rearing period:

- Focus on chicks -> 1st week mortality rate indicates mortality of rearing period

Mortality fattening period:

- Focus on week 12 to 15 and 20 to 21

Foot pad health

- Monitoring and evaluation of foot pad health already during rearing
  - Time frames of risk for FPD esp. 1st to 8th week of life

- Indicates husbandry conditions
  - To prevent foot pad lesions **variable litter dispersing frequency useful**

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„Animal Welfare in Intensive Livestock Production Systems“

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Boniturschlüssel für die Bewertung der Fußballengesundheit nach HOCKING et al. (2008)

Score	0	1	2	3	4
					
	No lesions	Small necrotic area	Hyperceratosis, necrotic area d ¼ of foot pad	Hyperceratosis, necrotic area d ½ of foot pad	necrotic area > ½ of foot pad

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