

# Brustbein Gesundheit bei Legehennen

28.9.2023

Lohmann Süd Tagung  
Bad Windsheim

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Lohmann Breeders



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# Brustbein-Brüche



Kein Bruch



Alter und frischer Bruch

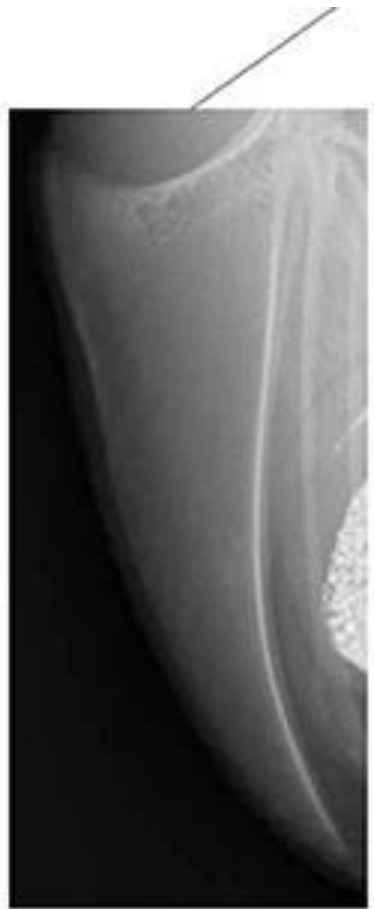
# Multiple keel bone fractures



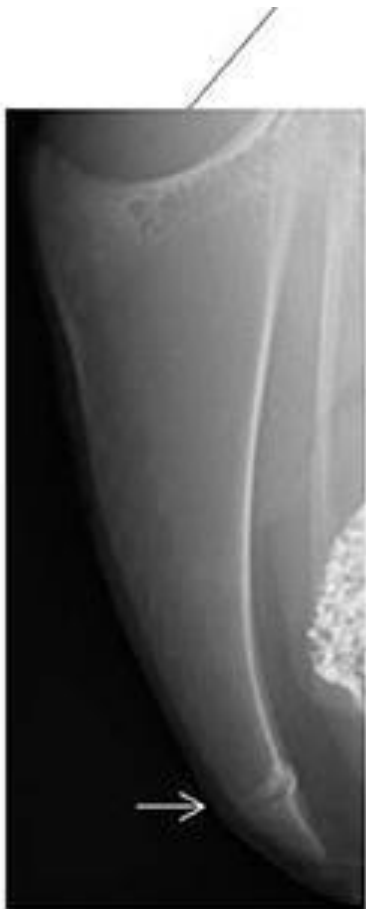
# Röntgenbilder



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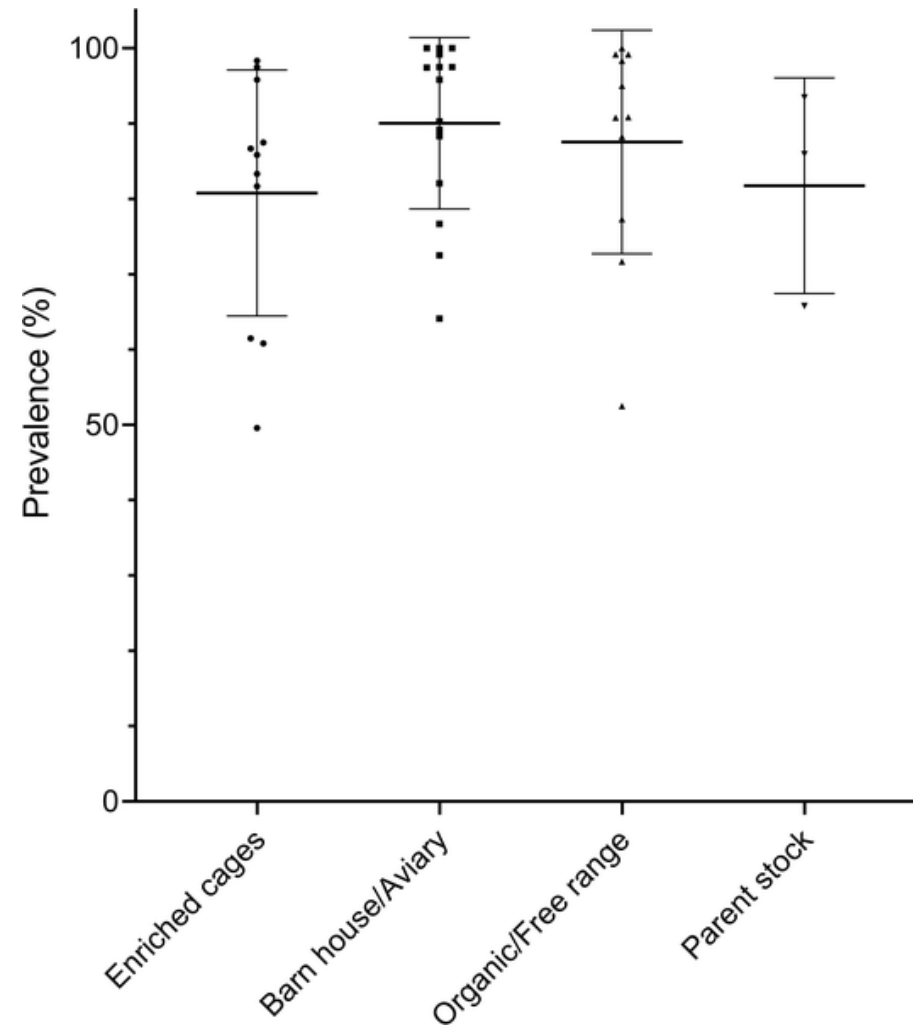
**Table 2. Distribution of the hen lines in 29 flocks out of the study population.**

<b>Hen line (n = 29)</b>	<b>No. flocks</b>	<b>KBF Prevalence (%)</b>
<b>Bovans Brown</b>	1	88.24
<b>Dekalb White</b>	1	99.16
<b>Hisex</b>	2	98.75
<b>Lohmann Brown</b>	2	79.32
<b>Lohmann Brown-Lite</b>	3	93.84
<b>Lohmann LSL Classic</b>	17	86.55
<b>Lohmann LSL Parent Stock</b>	3	81.55

<https://doi.org/10.1371/journal.pone.0256105.t002>



**Fig 1. Scatter plot of the flock prevalence of KBF within each production system.**

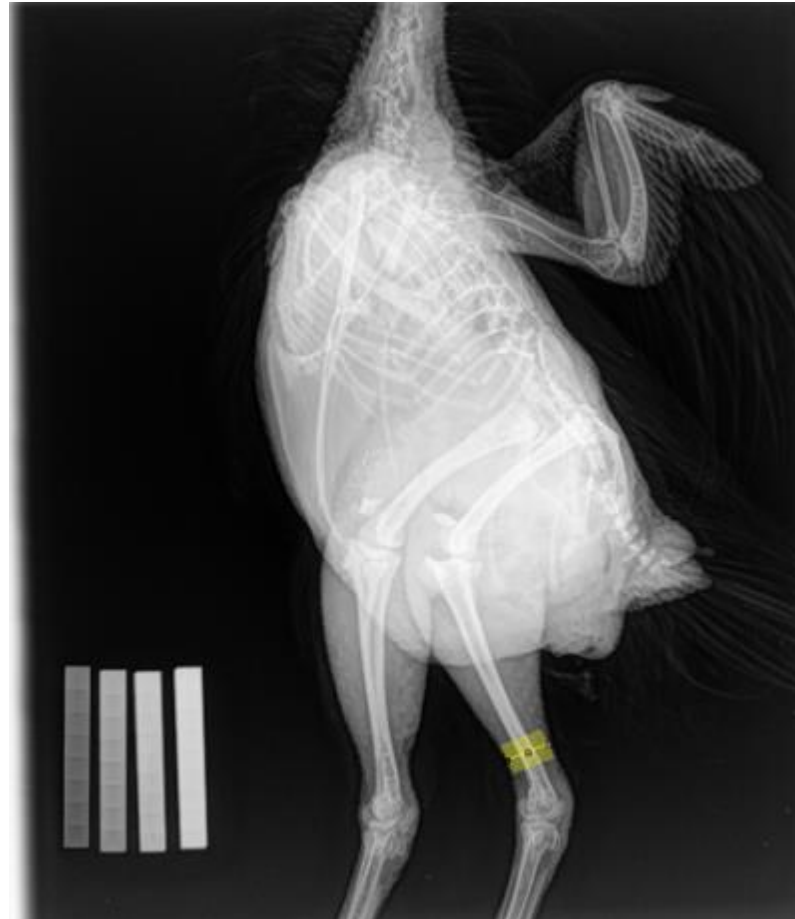


	Estimated average No. fractures/hen
<b>Production system</b>	
Enriched cages	1.4543
Barn house/Aviary	2.9300
Organic/Free range	2.5943
<b>Age at onset of lay (weeks)</b>	
20	2.4503
21	2.7789
22	1.8904
24	1.9131
<b>Body weight at depopulation (g), 500 g intervals</b>	
1000	2.3036
1500	2.3408
2000	2.2243
2500	2.0532
<b>Estimated daily egg weight/hen at onset of lay (g)</b>	
25	1.6685
30	1.9458
35	3.1913
40	2.8499
45	2.4993

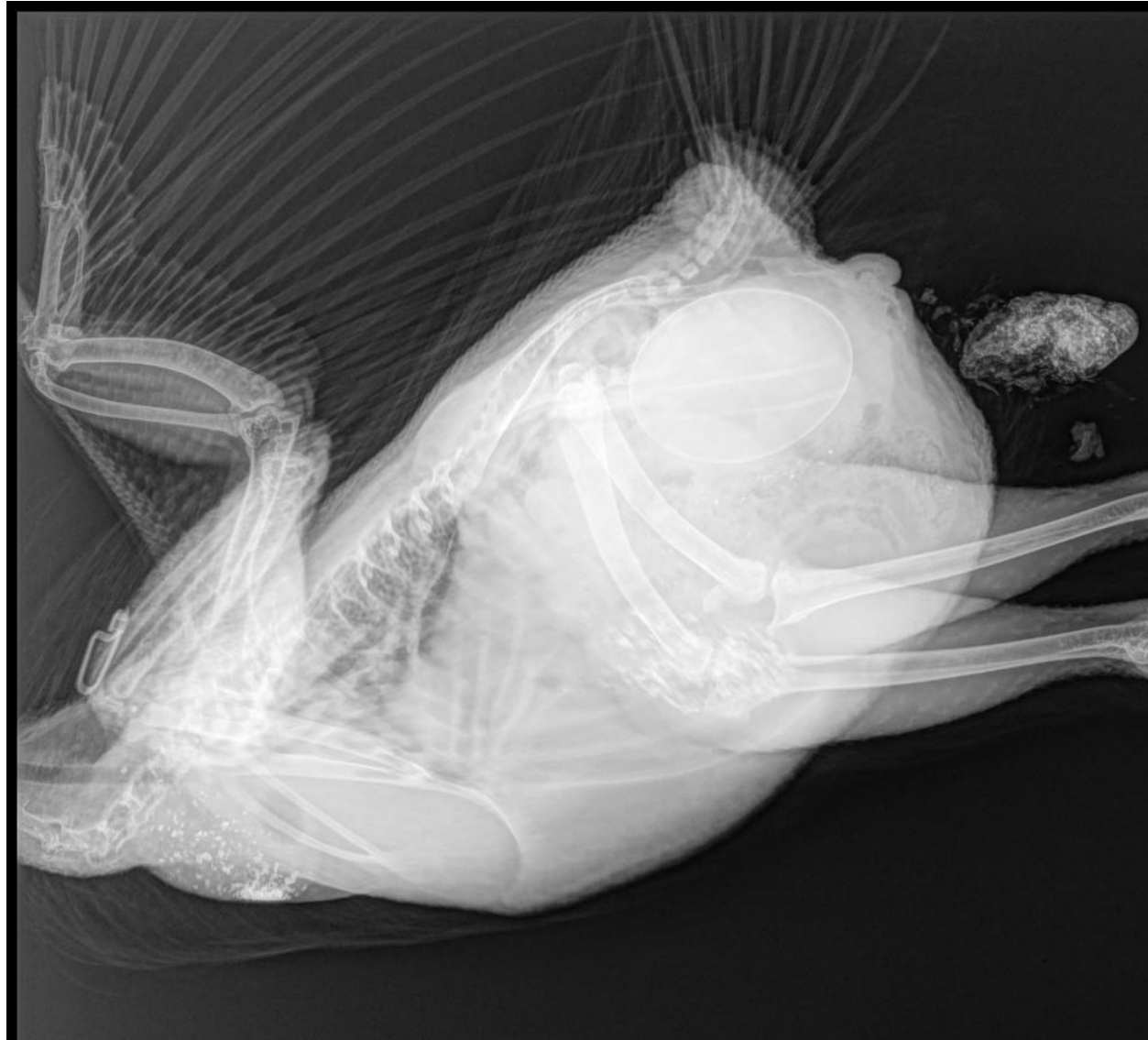
Thøfner ICN, Dahl J, Christensen JP (2021) Keel bone fractures in Danish laying hens: Prevalence and risk factors. PLOS ONE 16(8): e0256105. <https://doi.org/10.1371/journal.pone.0256105>



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# Palpation Note



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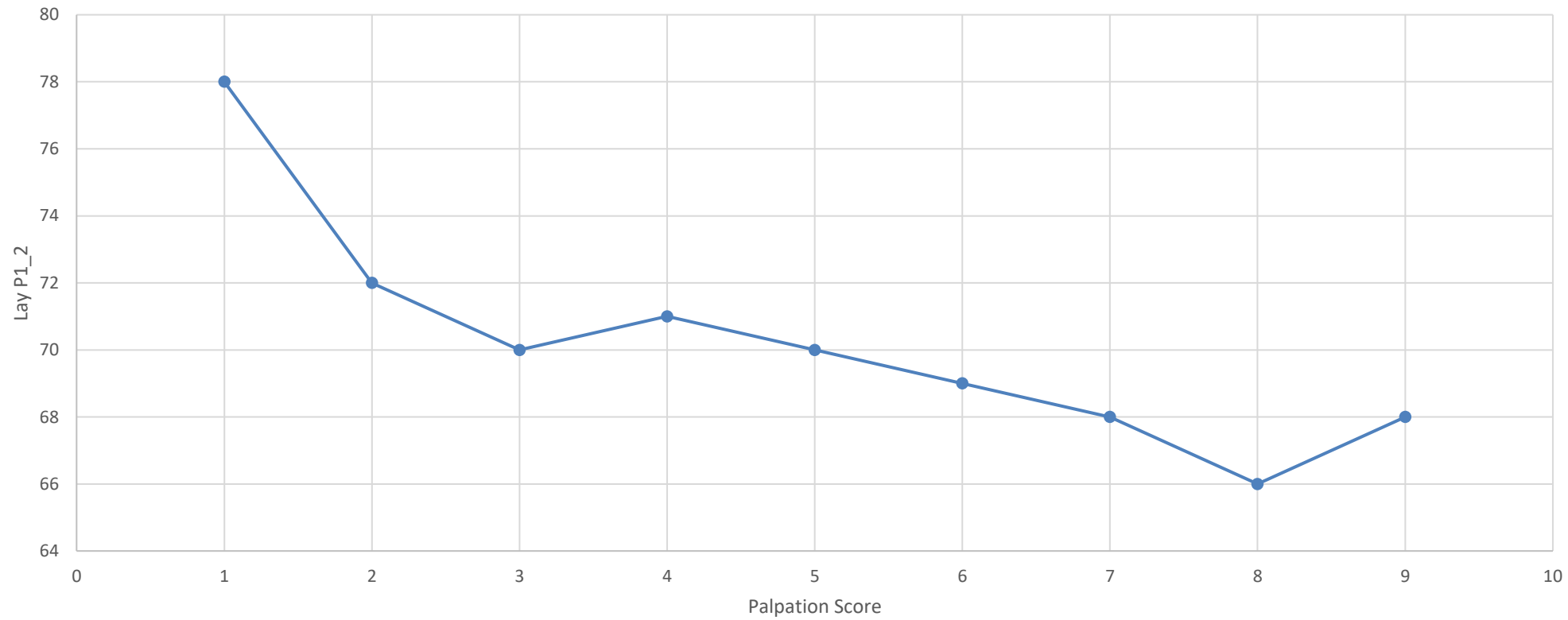
Line	Heritability Palpation Note	Genetische Korrelation Zu Legebeginn (P1_2)
A	0,26	-0,32
B	0,13	-0,34
C	0,32	-0,29
D	0,17	-0,51
E	0,22	-0,18
F	0,04	-0,21

# Zusammenhang mit Legebeginn



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Relation Keel Bone - Sexual Maturity



# Reliable Bone phenotype for Layer breeding

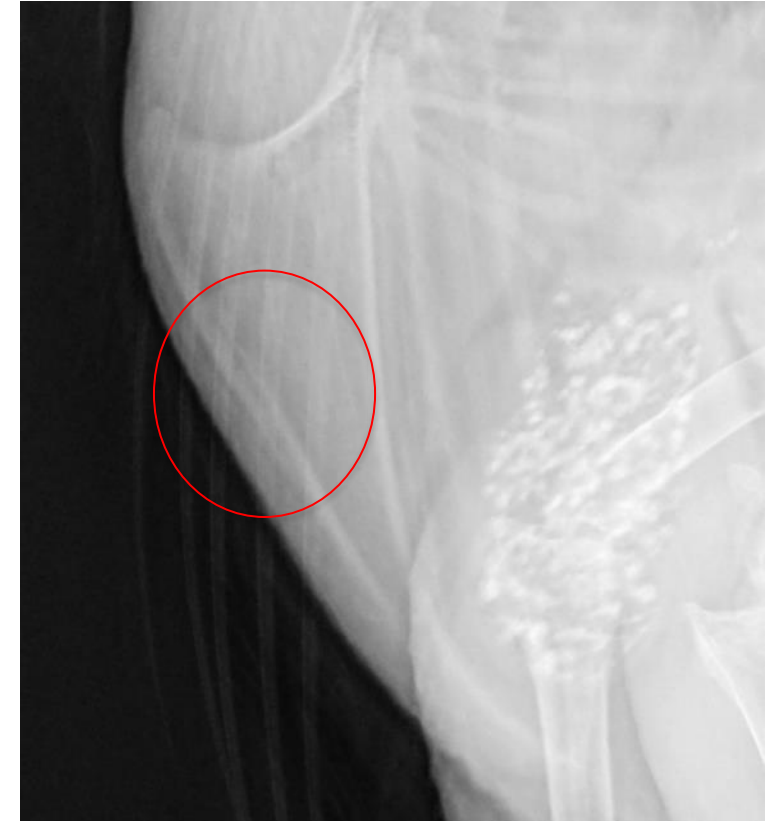
## 2. X-Ray



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**Keel bone** extremely difficult to measure

- Position of keel / covered by body
- Thickness / density of keel very low
  
- Correlation between long bones and keel bone  
 $r_g = 0.5 - 0.7$  (Bishop et al. 2000)
- Investigation on keel
  - Subjective palpation
  - Relation shape index and bone quality
  - Scoring of fractures/ deformations



# Literatur-Vergleich Weiße/Braune Hennen



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Rufener and Makagon | 543

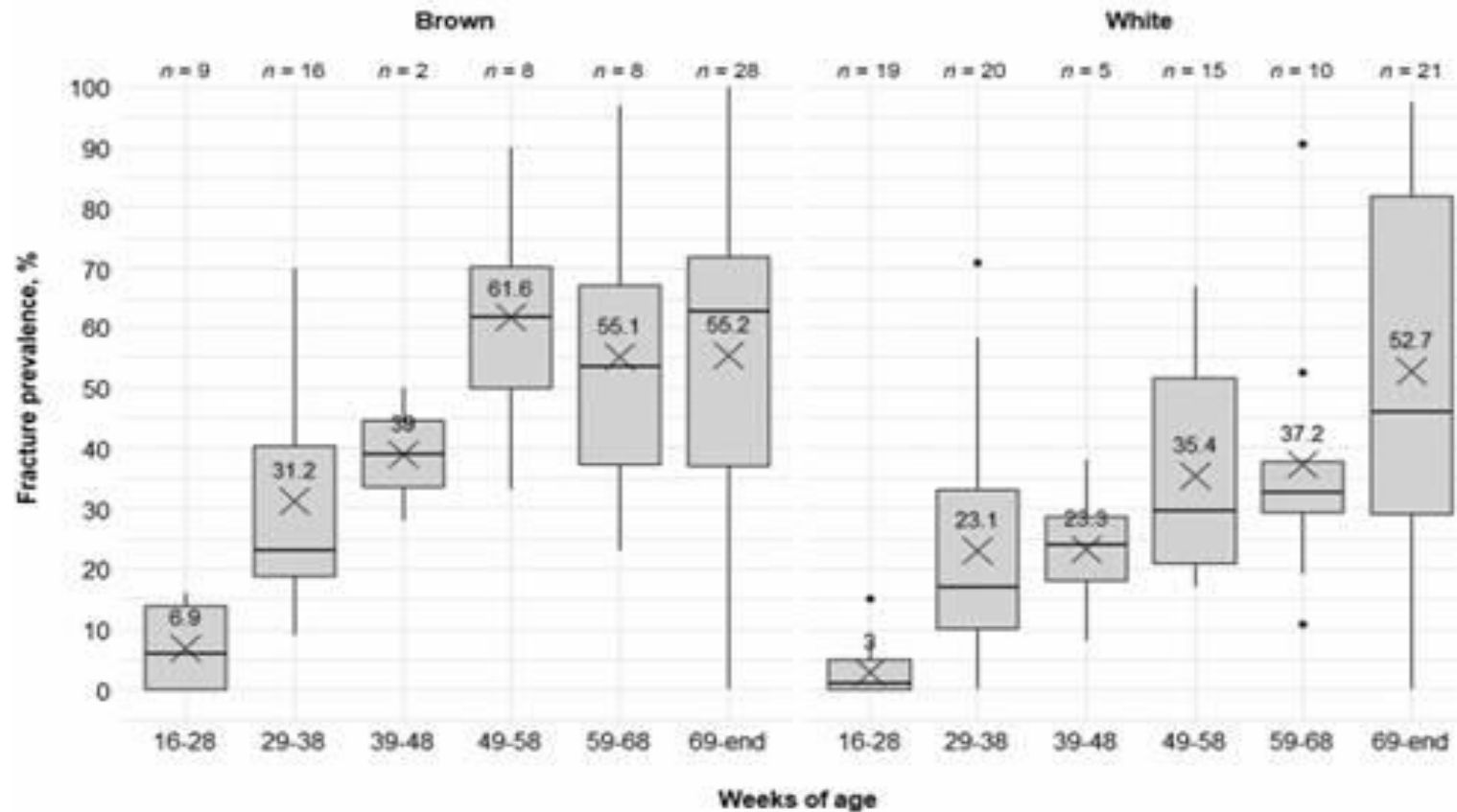


Figure 3. Keel bone fracture prevalence (%) across age categories and strains. Boxplots show medians and interquartile and absolute ranges of raw data plus outliers. The cross and numbers indicate mean prevalence. n indicates the number of entries within one category.

# Untersuchung bei Wildhühnern (Red Jungle fowl)



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Animals 2020, 10, 1655

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Table 1. Overview of keel bone findings in the jungle fowl.

	Hens <sup>1</sup>			Roosters <sup>2</sup>		
	n	%	95% CI <sup>3</sup>	n	%	95% CI
<b>Fractures</b>						
Yes	1	8.3%	0–48%	0	0%	-
No	11	92%	52–99%	17	100%	-
<b>Deviations <sup>4</sup></b>						
Yes	10 <sup>3</sup>	83%	47–97%	1 <sup>3</sup>	5.9%	0.7–36%
No	2	17%	3.5–52%	16	94%	64–100%

<sup>1</sup> n = 12; <sup>2</sup> n = 17; <sup>3</sup> Confidence interval; <sup>4</sup> all observed deviations were very slight.

### 3.2. Keel Bone Fractures

Only one of the 29 keel bones presented a visible fracture during autopsy, see Table 1. The keel bone belonged to a female jungle fowl. The fracture was not palpable due to barely any callus formation and it was only detected during autopsy. The fracture site was located caudally, on the tip of the bone. The fracture was on the dorsal side of the bone, which is not accessible by external palpation. It was visible as a dark line with a slight elevation, observed both visually and detectable with the fingertip. Figure 1 shows the keel bone with fracture, Figure 2 is a comparable keel bone with no fracture. It must be noted that the color of the bone varied between individuals, from dark red towards pinker colors.

1 von 12 Hennen hat Brustbein-Bruch  
10 von 12 Hennen haben Brustbein-Deformation

Kittelsen et al.;  
Animals, 2020



# Fakten / Botschaft:



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- Brustbeinbrüche sind keine Erscheinung die “neu” ist, es wurde früher aber weniger darauf geachtet als auf Brüche der Röhrenknochen
- Es ist ein multifaktorielles Problem
- Es tritt auch bei Wild-Hühnern und Niedrig-Leistungs-Hennen auf
- Die negative Beziehung zur Leistung der Hennen, v.a. zum Eigewicht ist bei weitem nicht so deutlich wie behauptet wird
- Die einzige deutliche negative Beziehung besteht zum Legebeginn / Frühreife
  - Mögliche kurzfristige Verbesserung: Lichtprogramm für späteren Legebeginn
  - Züchterisch: “Langsam-Legende Henne” mit genetisch spätem Legebeginn

***Thank you for your attention!***



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