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Grass for the birds?
Aspects on feed efficiency and welfare of dual-purpose chicken

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Dual-purpose chicken – ethically reasonable – but a challenge for efficiency



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Do chicken eat grass?

If yes, does it matter?

Would it help to compensate for lower efficiency of more extensive animals?



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Background I

Previous trial with **roosters from layer strains**:

Their **performance suffers less from forage integration into diet** compared to hybrid broiler strains

(Ammer et al., Agrarforschung Schweiz, 2017)

Less intensive feed for less intensive animals?!

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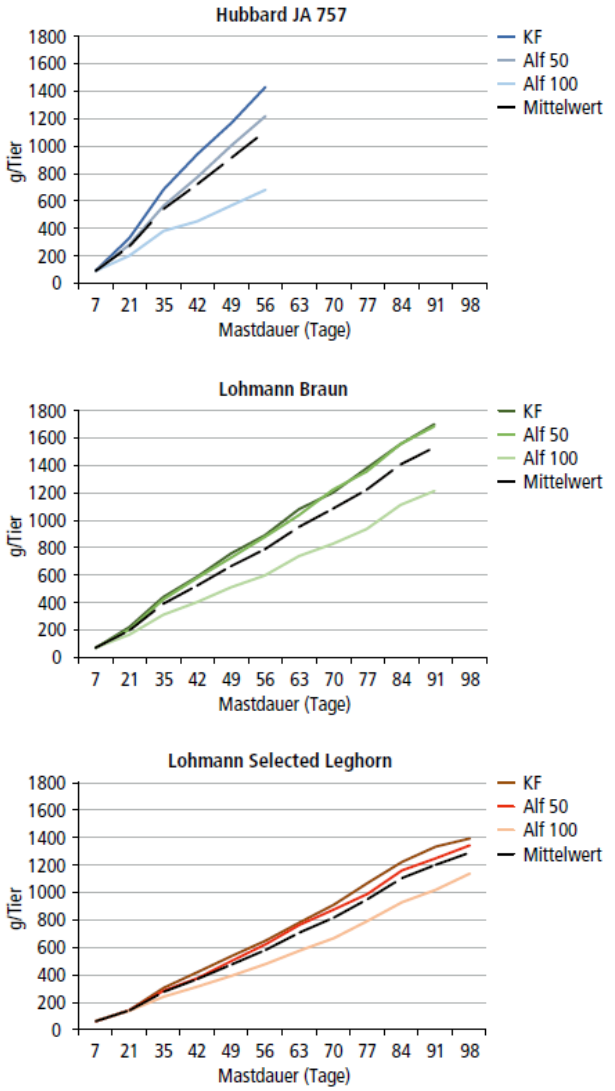
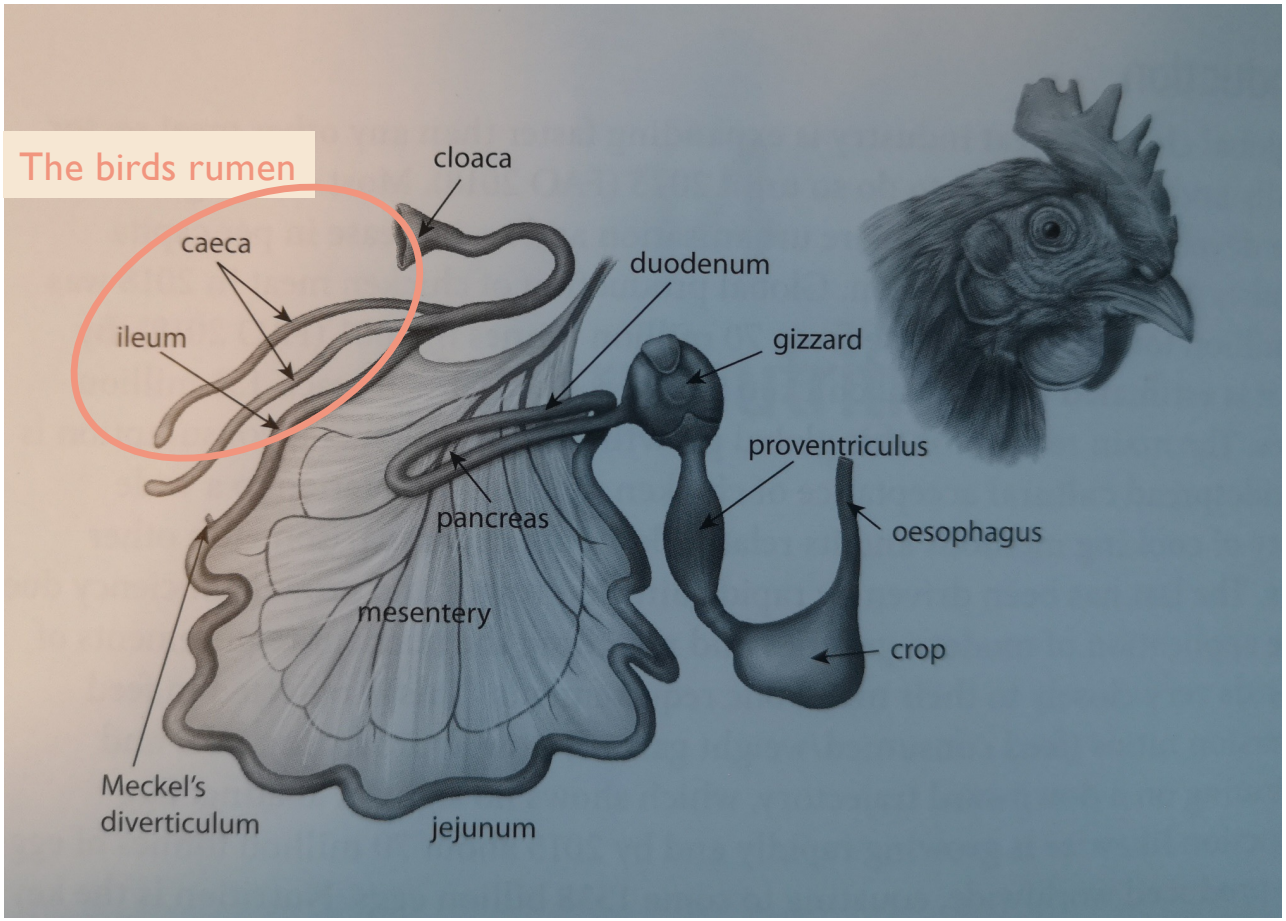


Abb. 2 | **Versuch B: Wachstumsentwicklung der Masttiere je Genotyp nach Fütterungsvariante unterschieden sowie im Mittel.**

Background 2

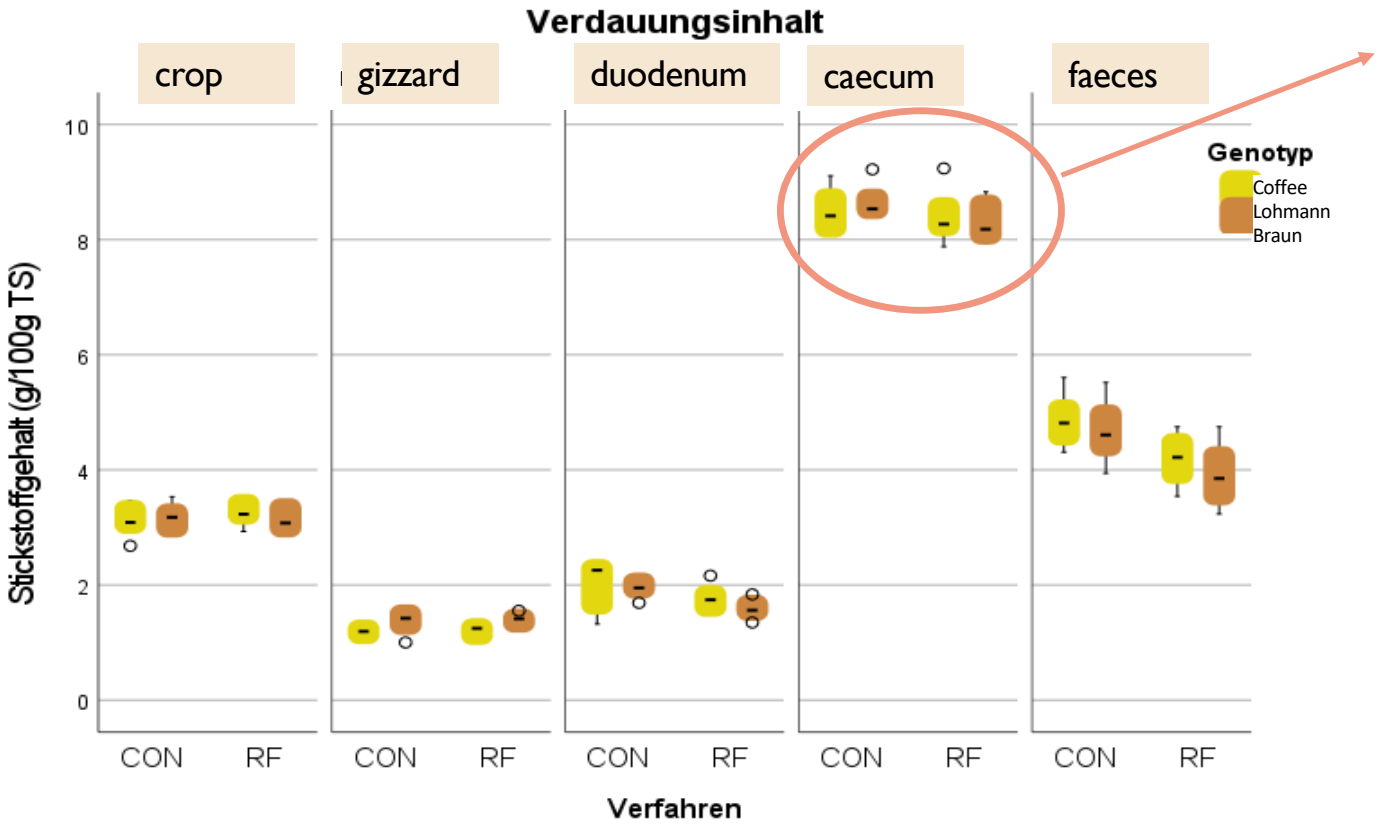
Caecal fermentation of fibre in chicken ->
N-utilisation from urine



Quelle: P. Hynd, Animal Nutrition

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Nitrogen concentrations along the chicken's digestive tract



Nitrogen in the ceaca comes from urine, is incorporated into microbial amino acids and protein and partly absorbed on site!

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Leiber et al., 2024; Agrarforschung Schweiz; https://doi.org/10.34776/afs15-89

Chicken eat and digest grass



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Animal welfare in livestock agriculture



Animal welfare = species-appropriate animal husbandry?

This would include:

- species-appropriate possibilities of movement
- **species-appropriate feeding opportunities**
- species-appropriate social behaviour
- species-appropriate relation to environment

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Chicken are omnivores

How much grass would they deliberately eat?



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FiBL research project «Rauhuhn»



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Feed intake of layer hens on pasture

	Coffee (213 animals)	Brown Nick (221 animals)	Signifikanz
Weidegang (min/Tag)	92.2	162.9	P<0.001
Feed intake			
Pasture DM (g/day)	**26.8 ± 4.5**	**23.9 ± 1.5**	Estimate
Pasture CP (g/day)	4.86 ± 0.76	4.63 ± 0.22	Average per animal
Pasture ADF (g/day)	6.46 ± 1.09	5.58 ± 0.39	Average per animal
chicken feed (g/day)	**103**	**94.5**	Average per animal
grains (g/day)	4.2	4.0	Average per animal
Laying performance %	**69.7 (expected 70)**	**73.7 (expected 90)**	n.s.

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Leiber et al., 2024; Agrarforschung Schweiz; https://doi.org/10.34776/afs15-89

Hen trial- conclusions

- Chicken eat grass
- Grass intake is considerable part of the diet
- Grass displaces chicken feed
- No underperformance for Coffee but for Brown Nick
- Important remaining question: land-use efficiency of such excercise



Fraktionierung der Futterbestandteile im Muskelmagen einer Henne aus der on-farm Studie (B); Beispiel. Im Mittel von 10 geschlachteten Hennen betrug der Grasanteil ca. 9% der Futtertrockensubstanz (0 – 22%).

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Broiler trial

Coffee-Broiler vs. Hubbard JA757 (48 animals each)

Metabolic measurement barn @Agrovet Strickhof

Standard feed vs. increased proportion of roughage (fibre)

Table 1. Nutrient composition of the experimental feedstuffs (g/100g dry matter; N=4)
[1] g/100g as fed
[2]data provided by the producer

	CON	EXT	S-L	S-H
Dry matter[1]	89.4	89.5	93.6	92.0
Crude ash	5.95	8.40	10.55	9.35
Crude protein	21.7	18.8	18.8	21.1
Crude fat	7.70	6.05	3.15	2.0
ADF	7.4	10.7	25.5	30.1
NDF	16.2	25.6	37.8	40.5
ADL	2.25	2.60	5.20	8.15
N-free extractables	47.7	49.1	42.4	35.1
Metabolisable Energy (MJ/kg as fed)[2]	12.2	10.0	n.a.	n.a.
Methionine (g/100g as fed) [2]	0.04	0.03	n.a.	n.a.
Lysine (g/100g as fed) [2]	0.12	0.10	n.a.	n.a.

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Feed efficiency of Broilers (Hubbard) and dual-purpose roosters (Coffee)

Table 3. Feed conversion efficiency of nutrients and diet components ($n = 6$ cages per genotype G × treatment T).

Genotype	Coffee				Hubbard					*p*-values		
Feed treatment[1]	CON	EXT	SH	SL	CON	EXT	SH	SL	SEM	G	T	G × T
FCR_{DM}[2]	4.65c	5.35a	4.48c	4.54c	3.94d	4.81b	4.01d	3.85d	0.108	<0.001	<0.001	ns
NCR_{CP}[3]	1.11a	1.13a	1.06ab	1.08a	0.94c	1.02b	0.95c	0.91c	0.038	<0.001	<0.01	ns
NCR_{ME}[4]	54.0a	51.9b	51.4b	52.2b	45.7c	46.7c	46.0c	44.2c	1.19	<0.001	ns	ns
$NCR_{Methionine}$[3]	0.017a	0.015b	0.017a	0.017a	0.015b	0.013c	0.015b	0.014c	0.000	<0.001	<0.001	ns
NCR_{Lysine}[3]	0.053a	0.050a	0.051a	0.051a	0.045b	0.045b	0.045b	0.044b	0.001	<0.001	ns	ns
$FUR_{soybean\ cake}$[5]	1.35a	0.87c	1.28a	1.29a	1.14b	0.78d	1.14b	1.10b	0.028	<0.001	<0.001	ns
FUR_{maize}[5]	1.16a	0.64c	1.09a	1.12a	0.98b	0.58c	0.98b	0.95b	0.024	<0.001	<0.001	<0.1
FUR_{wheat}[5]	0.47c	0.62a	0.44c	0.45c	0.39d	0.55b	0.39d	0.38d	0.011	<0.001	<0.001	ns
$FUR_{grassmeal}$[6]	0.14d	0.29a	0.22c	0.21c	0.12e	0.26b	0.20c	0.18c	0.014	<0.05	<0.001	ns

Notes: FCR, Feed conversion ratio; NCR, Nutrient conversion ratio; FUR, Feed utilisation ratio [1]CON, control standard feed; EXT, high fibre/low protein feed; SL, low-protein lucerne hay separately offered plus CON; SH, high-protein lucerne hay separately offered plus CON. [2]kg DM feed intake per kg carcass weight.[3]kg intake of indicated nutrient per kg carcass weight.[4]MJ intake of metabolisable energy per kg carcass weight. [5]kg intake of indicated feed component per kg carcass weight. [6]kg grass-lucerne meal intake per kg carcass weight. Values in rows followed by different letters are significantly different. ns, not significant.

Protein utilization: remains unchanged
Energy utilization: improves

Protein utilization: worsens
Energy utilization: remains unchanged

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Leiber et al., 2025
BIOLOGICAL AGRICULTURE & HORTICULTURE
https://doi.org/10.1080/01448765.2025.2483212

Chicken eat grass



- Grazing is a natural, deliberately chosen behaviour for chicken.
- Under the given conditions, they would cover approx. 20% of their requirements from grass.
- Diets for dual-purpose chicken may be less intensive without impact on expected performance.
- Still, dual-purpose chicken perform on a generally lower level than hybrids (also other literature).
- In an outdoor-run system with pasture, dual purpose chicken make more sense than hybrids.

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