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Evaluation of performance and economy of dual-purpose genotypes as an alternative to the elimination of one-day-old male layer chicks

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Eurogroup for Animals
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PPILOW Status of chick culling in Germany and France

Layer strain

Selection based on egg production, egg quality traits

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Progeny

Fertilized eggs

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Chicks

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Culling of day-old male chicks

FR: Article R214-17

- From 1/1/2023 : all hatcheries have to be equipped with operational material to avoid culling chick
  -> Special case when it is not possible to respect the decree

DE: Article TierSchtG Art. 1 § 4c

- From 1/1/2022 : makes it a punishable offence to kill a vertebrate animal "without reasonable cause" (unprofitability) or to cause it suffering and pain

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PPILOW Status of chick culling in Germany and France

Layer strain

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Culling of day-old male chicks

Stategies :

- **Fattening of males of layer lines** → selected on egg production, males might have a low economic value (variable depending on the level of production targeted)

- **In ovo sexing** → In ovo sexing is a method used in poultry farming to determine the sex of bird embryos before hatching

- **Dual-purpose genotypes**

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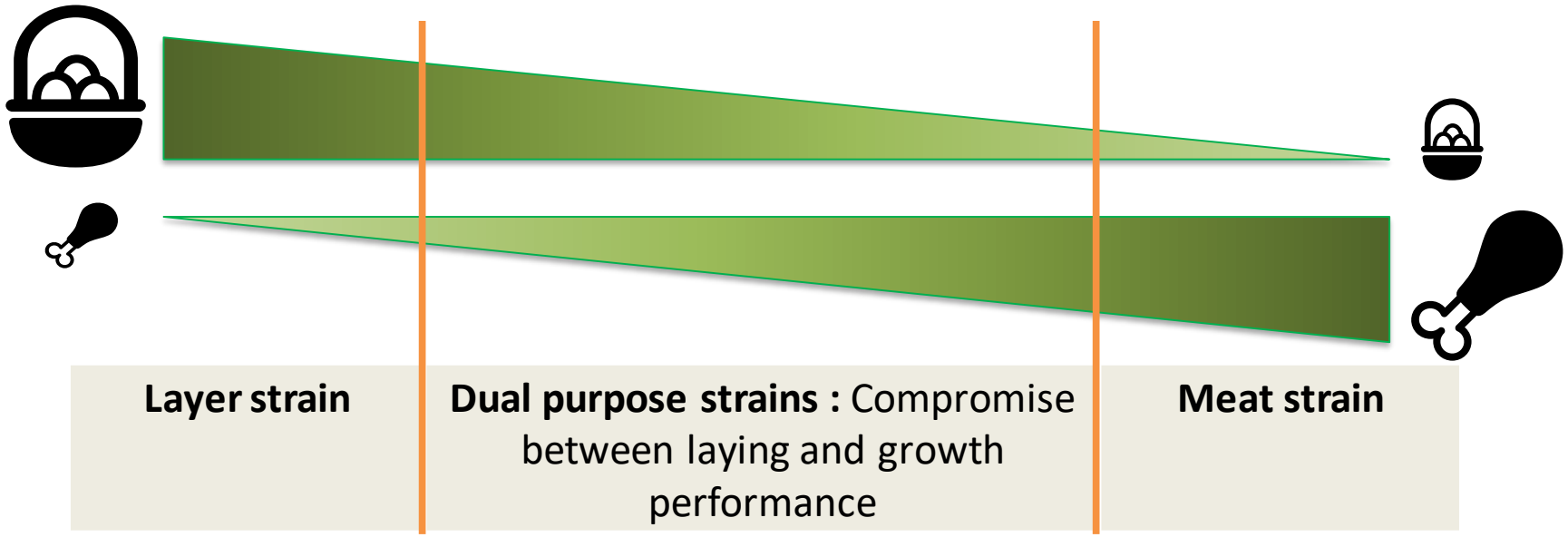
PPILOW Dual purpose genotype



- Dual-purpose strain : females reared for egg production, males for meat production

→Laying and growth performance lower than the ones of specialized strains

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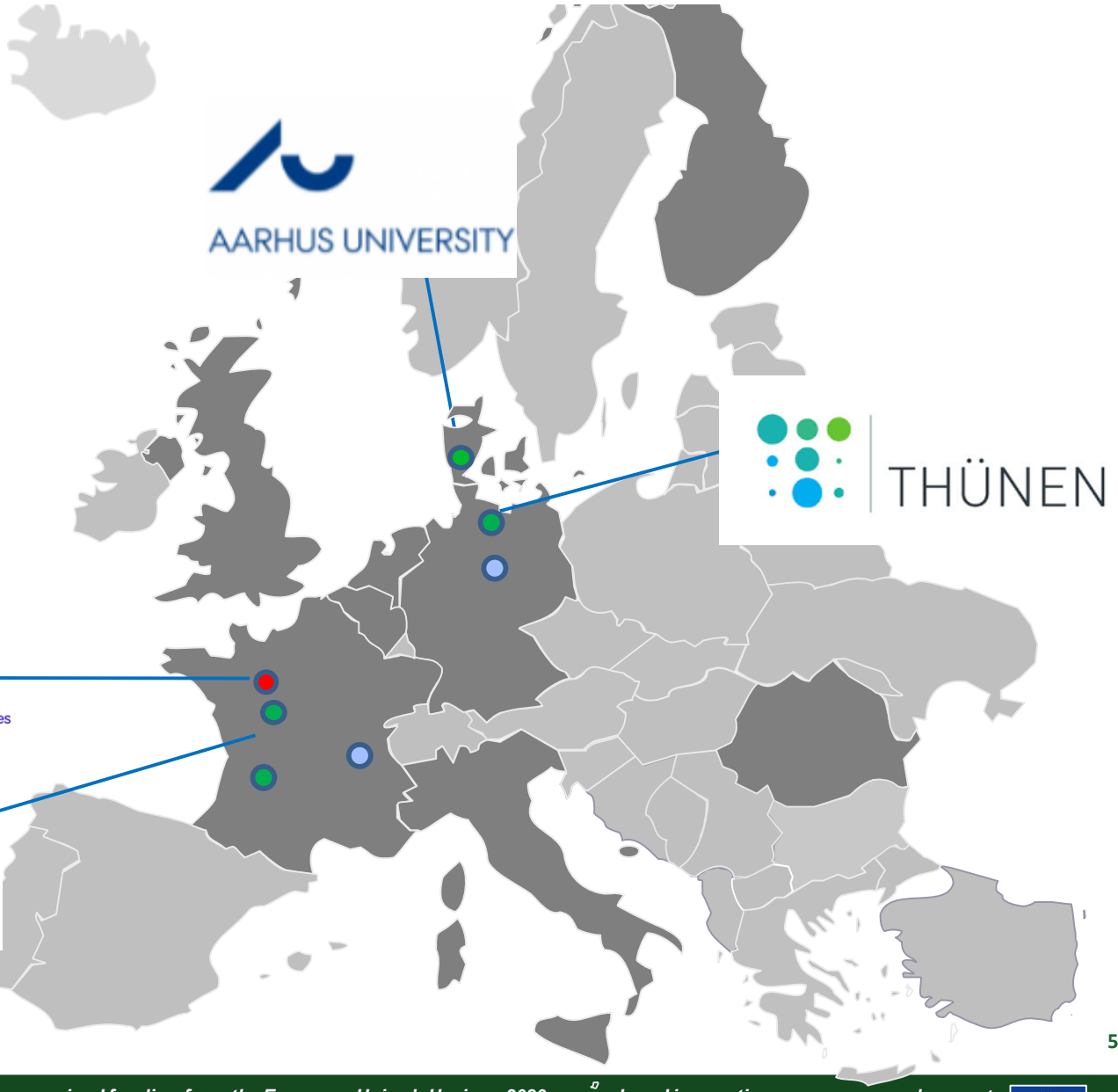
PPILOW Partners : trials on dual-purpose genotypes

- Farms involved
- Research institutes
- Technical institute



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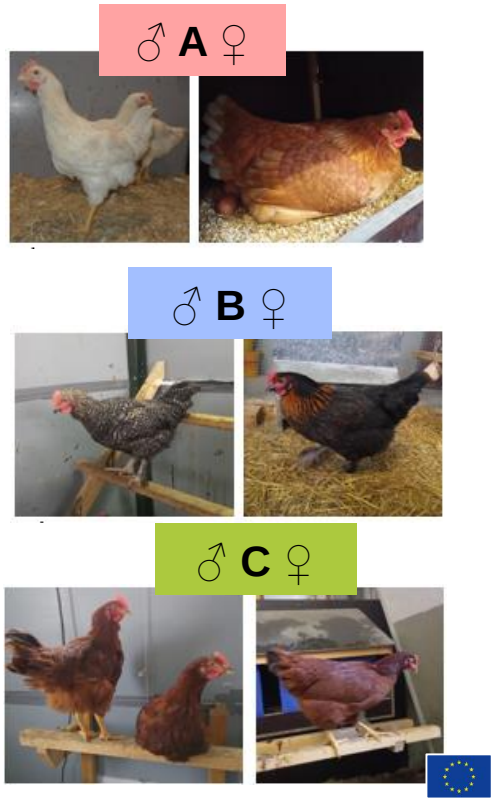
PPILOW Objectives

Aim of the study : to compare performance, behaviour and welfare of three different dual-purpose genotypes rear in three different countries, Denmark, France and Germany under organic conditions

Génotype A : dual-purpose cross breed (meat production)

Génotype B: dual-purpose rustic breed

Génotype C : dual-purpose cross breed (eggs production)



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PPILOW Comparison of the on-station laying performances

Genotype A	Denmark	Germany
Weight wk 18, g	2288	2301
Number of eggs at week 62	219	211

Genotype B	Denmark	Germany
Weight wk 18, g	1924	1884
Number of eggs at week 62	224	231

Genotype C	Denmark	Germany
Weight wk 18, g	2051	1872
Number of eggs at week 62	245	232

→ **Publication in 2021**

Open Access Article

Dual-Purpose Poultry in Organic Egg Production and Effects on Egg Quality Parameters

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PPILOW Comparison of the on-station fattening performances

Génotype A	Denmark	Germany	France Spring / summer	France Autumn / winter
Live weight wk 12, g	2019	2203	1977	1885
Average feed consumption per day, g/d	74	89	76	75
FCR	3,1	3,4	3,3	3,4

Génotype B	Denmark	Germany	France Spring / summer	France Autumn / winter
Live weight wk 12, g	1645	1763	1577	1466
Average feed consumption per day, g/d	63	72	62	63
FCR	3,3	3,5	3,4	3,7

Génotype C	Denmark	Germany	France Spring / summer	France Autumn / winter
Live weight wk 12, g	1732	1634	1393	1551
Average feed consumption per day, g/d	64	65	52	66
FCR	3,1	3,7	3,2	3,6

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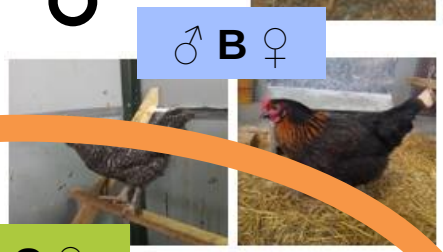
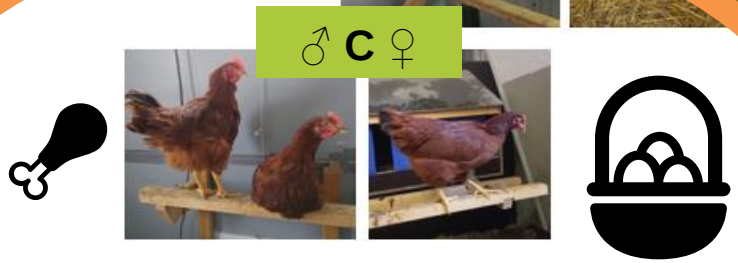
PPILOW Genotypes & National Practitioner Group decision

On-station results on the fattening of males





On-station results on the egg production of laying hens

Based on these results, the NPG in each country selected the most promising genotype to be tested on the farm

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Different rearing conditions in France and Germany

	France	Germany
Number of birds	C 220/F 220	C 220/D 520
Same hatch for C	✓	✓
Diet	Different	Different
Feed consumption	✓	✓
FCR	✓	✓
Behaviour observations	✗	✓
Welfare indicators	✗	✓
Mortality	✓	✓
Age at slaughter, wks	13 and 15	C 16 / D 13
Carcass weight	✓	✓
Valuable cuts	✓	✗

FR: Control genotype (S757N)

DE: Control genotype (JA757)

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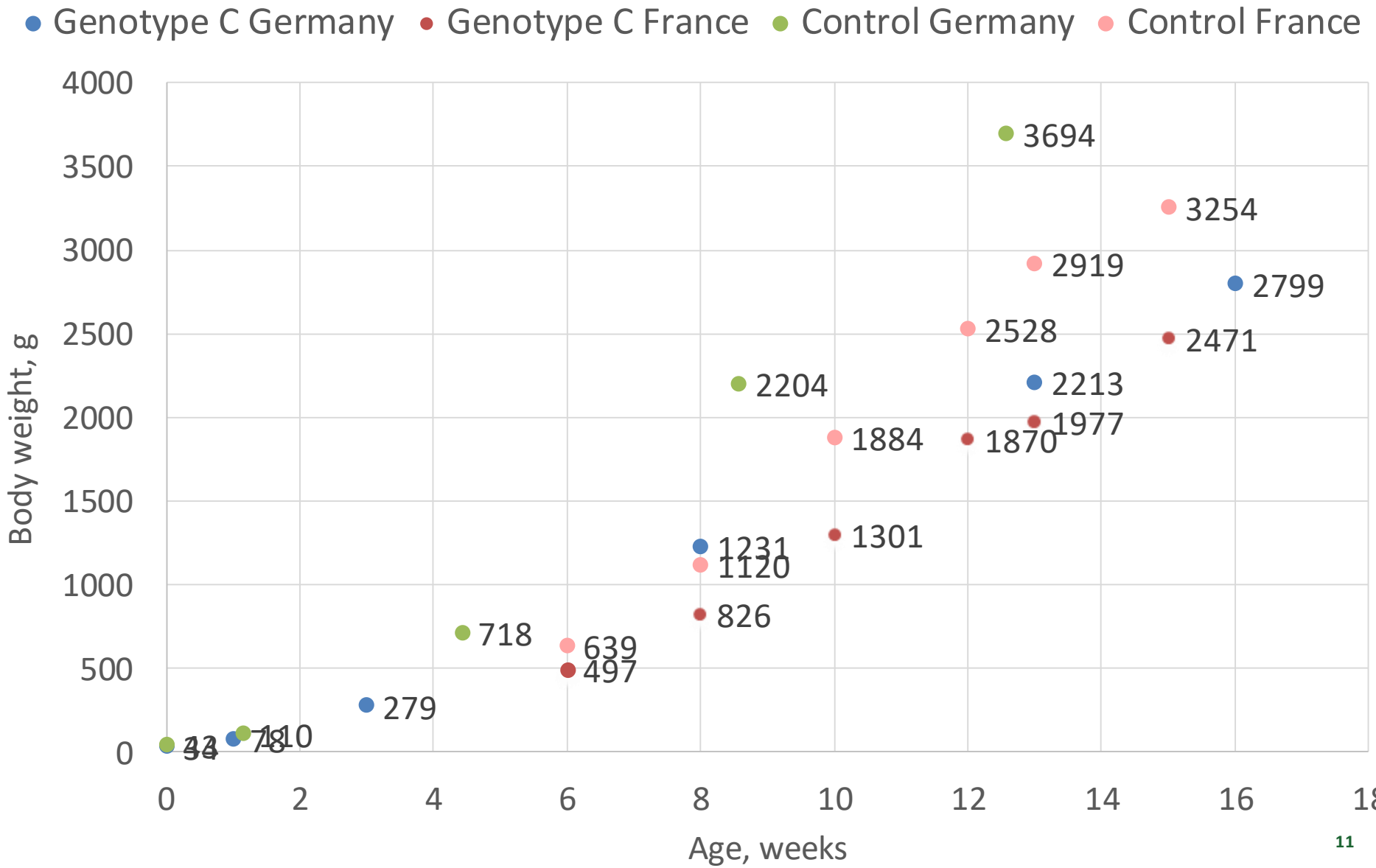
PPILOW On-farm trials results – Growth curves of genotypes



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PPILOW On-farm trials results – Technical data

	France		Germany	
	C	F	C	D
Mortality, %	4.57	1.4	11	1.2
FCR (13 wk)	3.73	2.60	3.7	2.7
Carcass weights at 13 wk, kg	1.38*	1,98*		2.4
Carcass weights at 15 wk, kg	1.72*	2.41*		
Carcass weights at 16 wk, kg			1.8	

* Including neck

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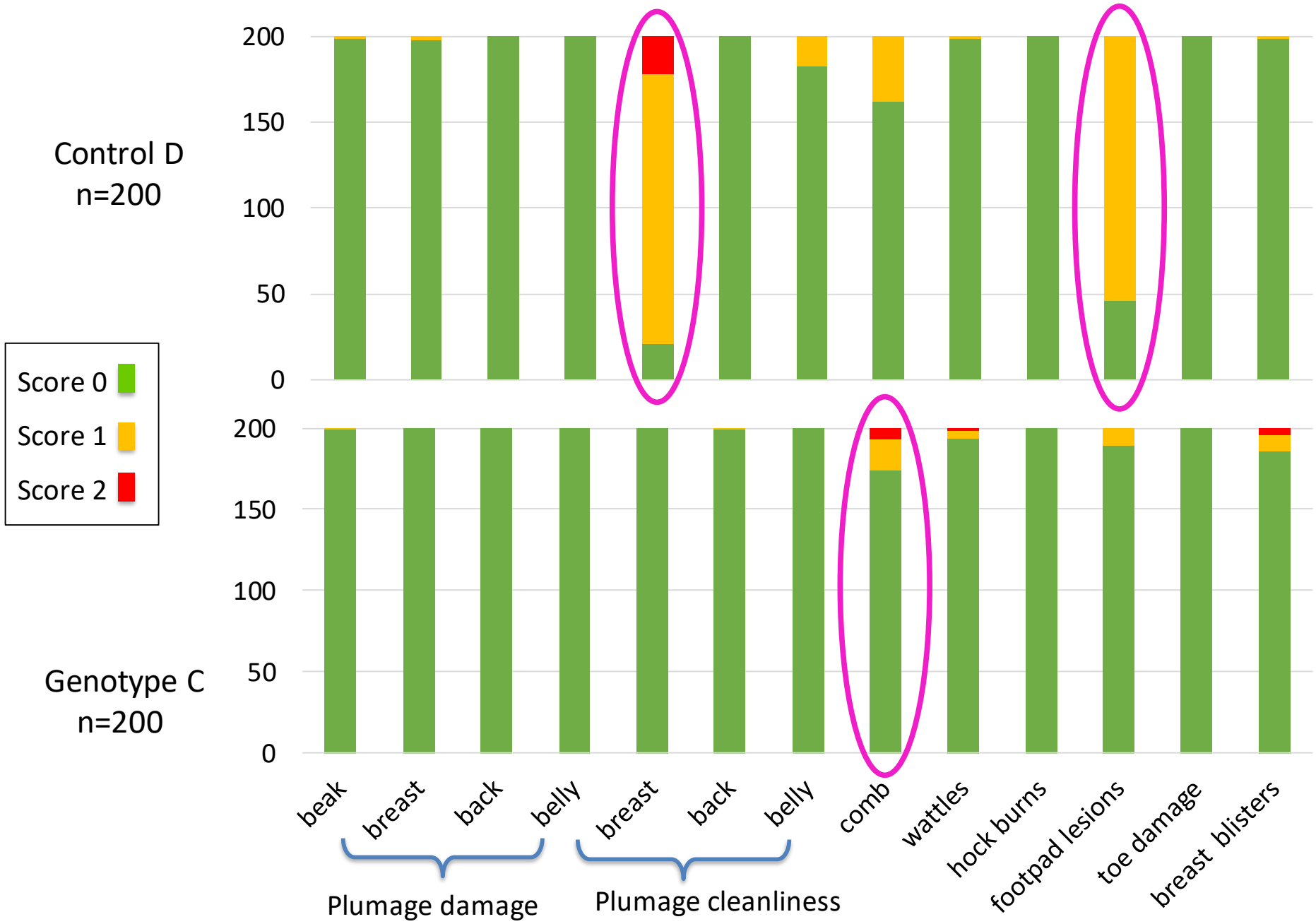
PPILOW On-farm trials results – Welfare indicators in Germany



PPILOW On-farm trials results – Carcass characteristics in France

At week 13: Avg ± SE

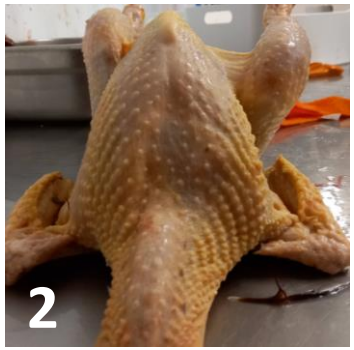
	C	F
Legs weight (g)	448 ± 9	668 ± 12
Wings weight (g)	180 ± 3	246 ± 4
Breast weight (g)	201 ± 5	354 ± 11

At week 15 : Avg ± SE

	C	F
Legs weight (g)	574 ± 12	838 ± 9
Wings weight (g)	219 ± 6	286 ± 3
Breast weight (g)	269 ± 4	462 ± 6

Carcass conformation scores

	Genotype	Score 0	Score 1	Score 2
Wk 13	F	**100%**	0	0
	C	0	0	**100%**
Wk 15	F	**97%**	3%	0
	C	4%	**39%**	**58%**



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PPILOW Conclusions

- **Genotype C** (same batch) was reared in two different environments

- Up to 15 and 16 weeks of age

→ Similar FCR & carcass weights in both countries
→ Very good welfare
→ Very active birds

Around Europe :

- **More farmers interested to test dual-purpose breeds on their farms**
- **Some farmers from NPG are implementing the innovation**

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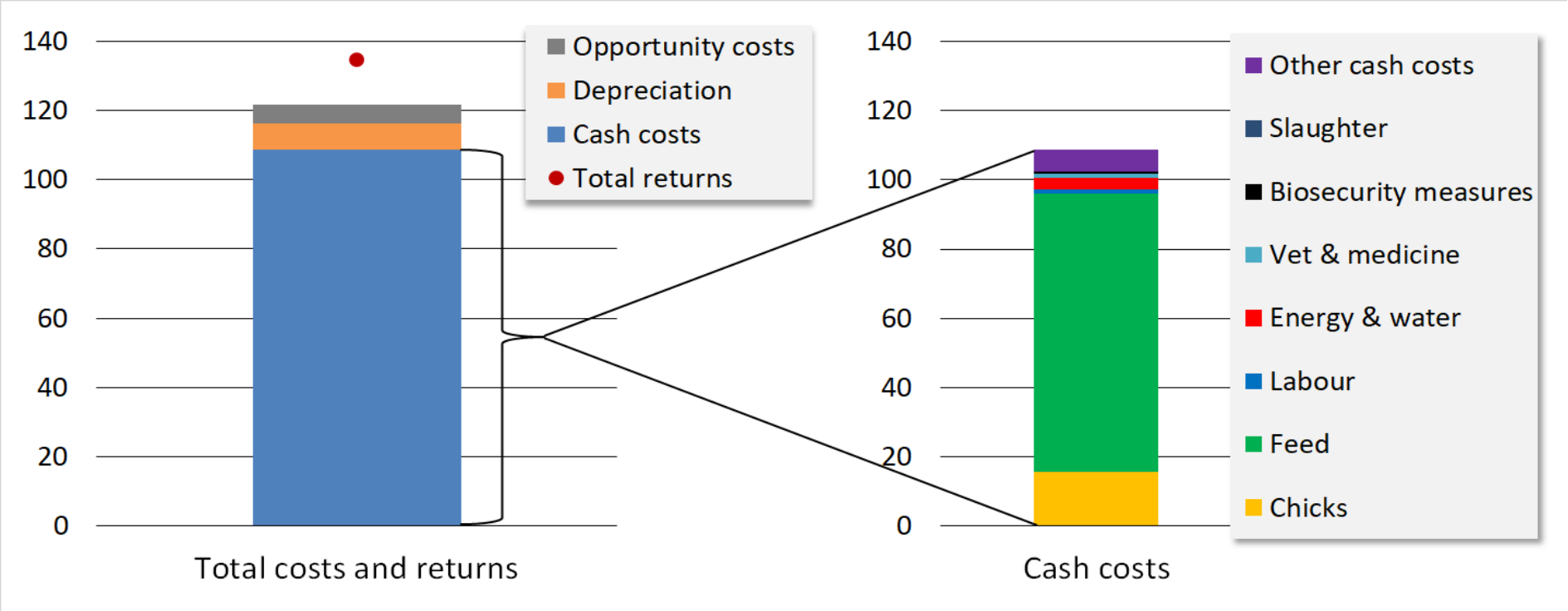
Data Analysis

Physical parameters:

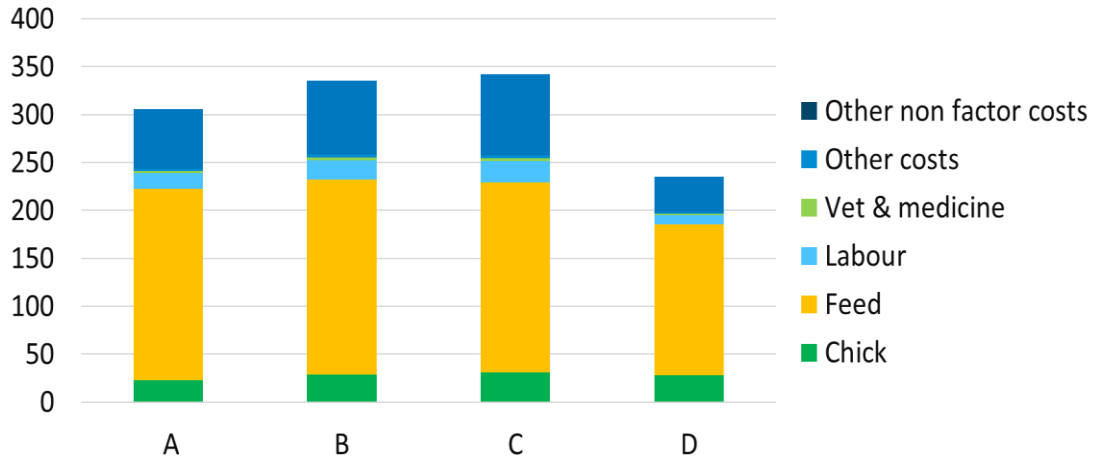
- Nr. cycles/year, Daily weight gain, Mortality rate, FCR

Production costs and returns (EUR/100 kg LW of produced chicken meat)



PPILOW WP 7 - Economic assessment – first results – „on-station“ / males

Costs of production of male dual purpose breeds of on-station trials in Germany (€ / 100 kg LW)



Impact on production costs on farm level:

- Genotype (GT) A: lowest production costs among dual purpose genetics.
- Full cost differences:
  GT A to JA757:
  70 €/100 kg LW
  GT C to JA757:
  107 €/100 kg LW

Conclusions

- The more emphasis on laying performance the dual purpose genotypes have, the poorer the feed conversion and the higher the production costs.
- The higher the production costs are for fattening male dual purpose breeds, the higher the selling prices should be for the cock (to cover costs). Alternatively, the costs can be "cross-subsidized" via a price premium for eggs.

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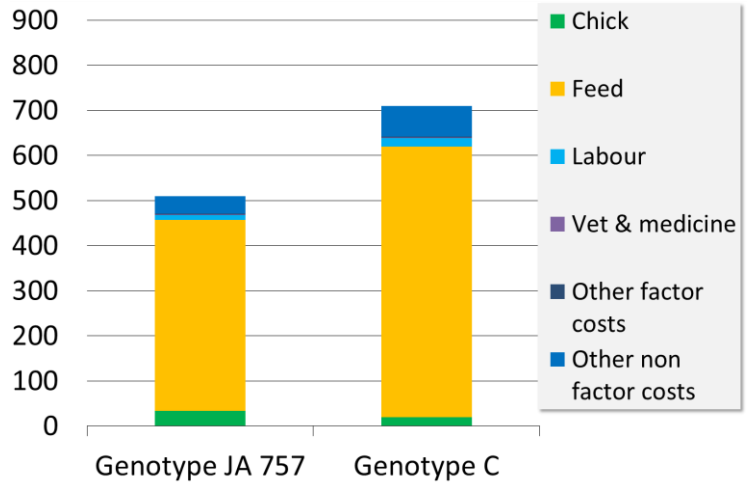
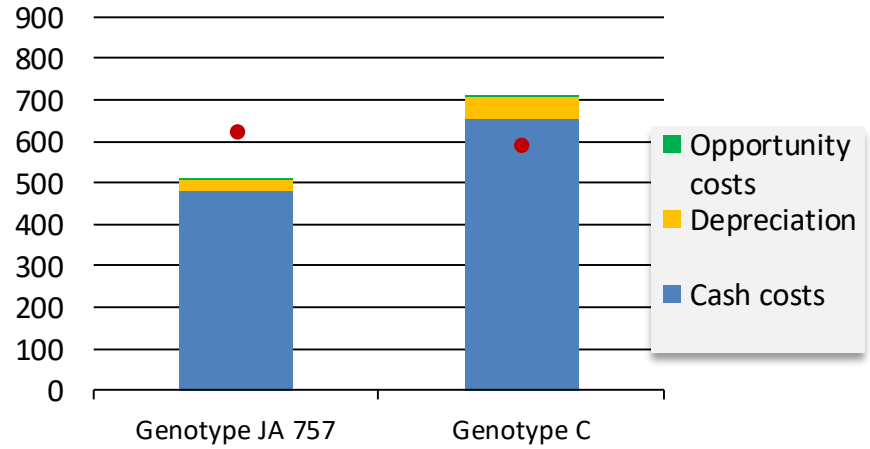
PPILOW WP 7 - Economic assessment – first results – „on-farm“ / males

Costs of production and profitability of male of dual purpose breeds of on-farm trials in Germany (EUR/100 kg live weight)





Impact on production costs/farm level:

- JA757 chickens have lower production costs compared to GT C chickens.
- GT C has higher production costs due to higher feed costs (40 % higher FCR and 60 % lower daily weight gain)

Conclusions

- The higher the production costs are for fattening male dual-purpose breeds, the higher the selling prices should be for the cock (to cover costs)
- Alternatively, the costs can be "cross-subsidized" via a price premium for eggs
- Rearing JA757 chickens is profitable while rearing GT C is unprofitable, due to the high feed costs

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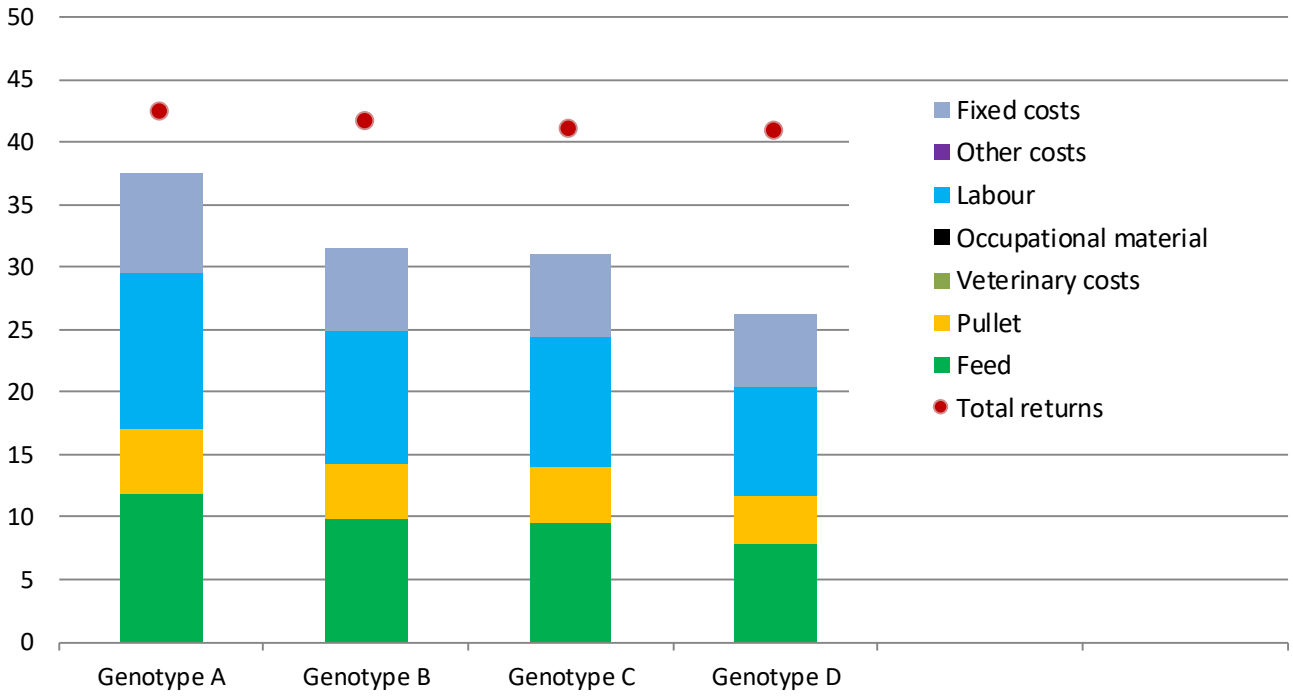
PPILOW WP 7 - Economic assessment – first results – „on-station“ / females

Comparison of production costs (€ cent per egg)



- B and C: best performance in terms of egg production (B + 0.6 cent/egg)
- C to control group D: + 4.8 cents/egg (+18%)
- A to control group D: + 11.3 cents/egg (+43%)
- egg price fixed barn: 34 cent/egg
- egg price mobile barn: 38 cent/egg

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PPILOW WP 7 - Economic assessment — sibling performance „on-station“

Comparison of sibling performances (FCR)

	A	B	C	D
Feed rearing, kg	10,9	9,6	10,4	8,9
Feed laying phase, kg	49,4	48,2	47,6	46,0
Cockerel, kg	1,26	1,43	1,38	
Old hen, kg	1,64	1,44	1,43	1,20
Egg mass, kg	15,3	17,5	18,2	21,4
kg feed per kg food product	3,73	3,34	3,23	2,43

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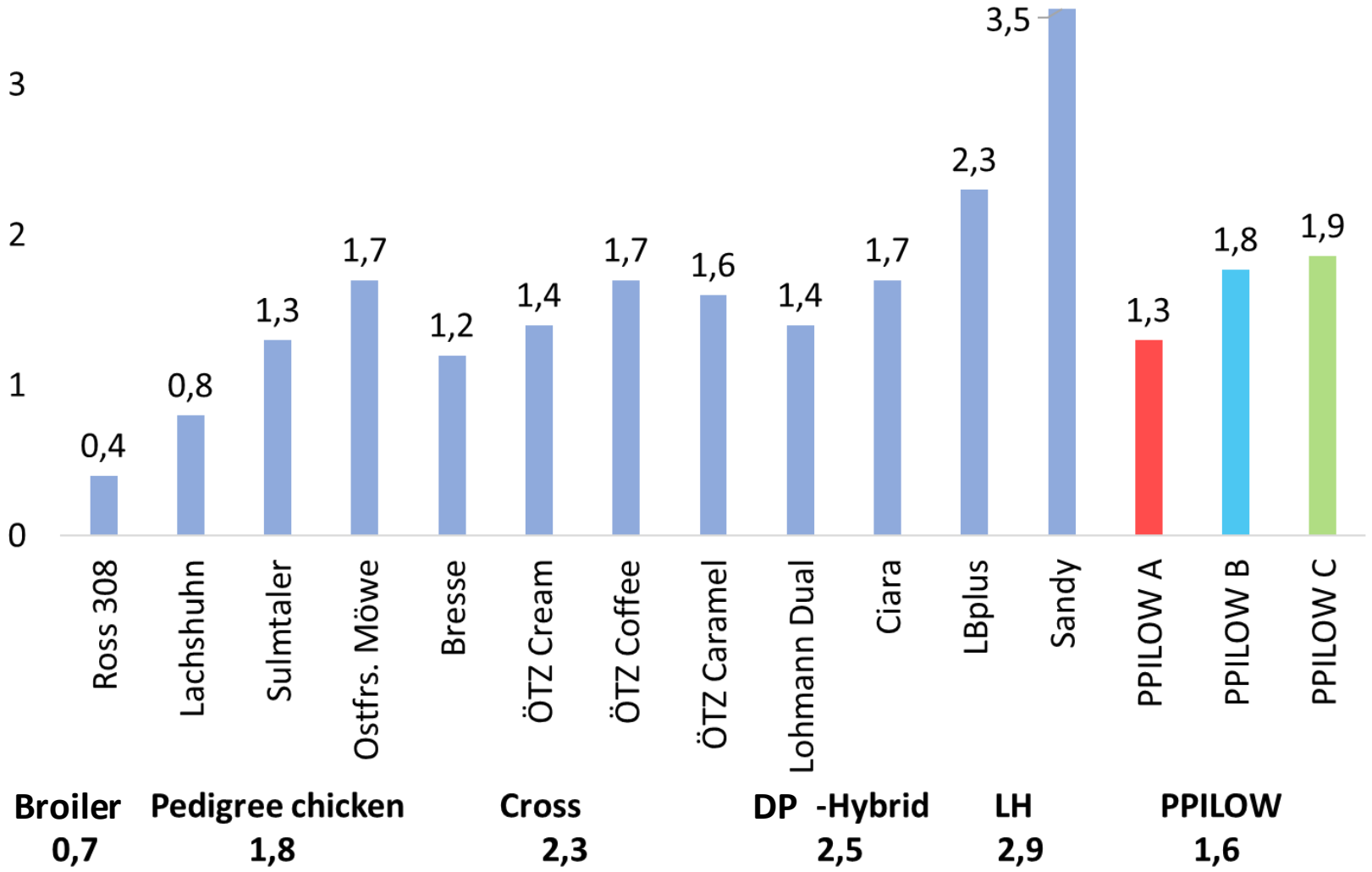
PPILOW WP 7 - Economic assessment — Dual purpose index



Quelle ZNI-Werte: Hörning, 2023, https://doi.org/10.12767/buel.v101i3.495

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PPILOW Conclusions

1. Breeding strains or brothers of dual-purpose hens is an alternative that may be of interest to some consumers.

2. The market is non-existent in France and the cockerel market remains limited (<18 million/year). Maybe in Denmark or Germany?

3. Some zootechnical constraints or points to consider:

- Rearing conditions and length of rearing, with management of pecking in particular.
- Will the presentation of the final product be satisfactory to the consumer?

4. Longer fattening period with higher FCR → higher feed costs than control males
   - A major economic constraint! Higher production cost

5. Is this environmentally reasonable?

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PPILOW **PARTNERS**


Thank you for your attention

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