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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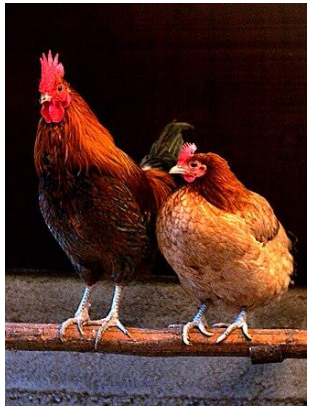
Autumn school
October 25, 2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 816172

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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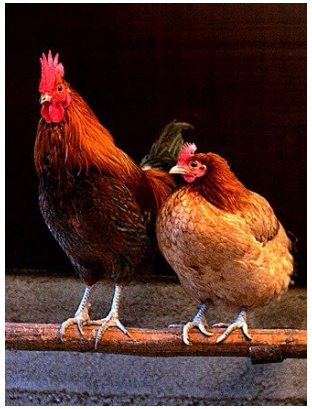

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Chicks

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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** → presented by Sophie Rehault-Godbert
- **Dual-purpose genotypes**

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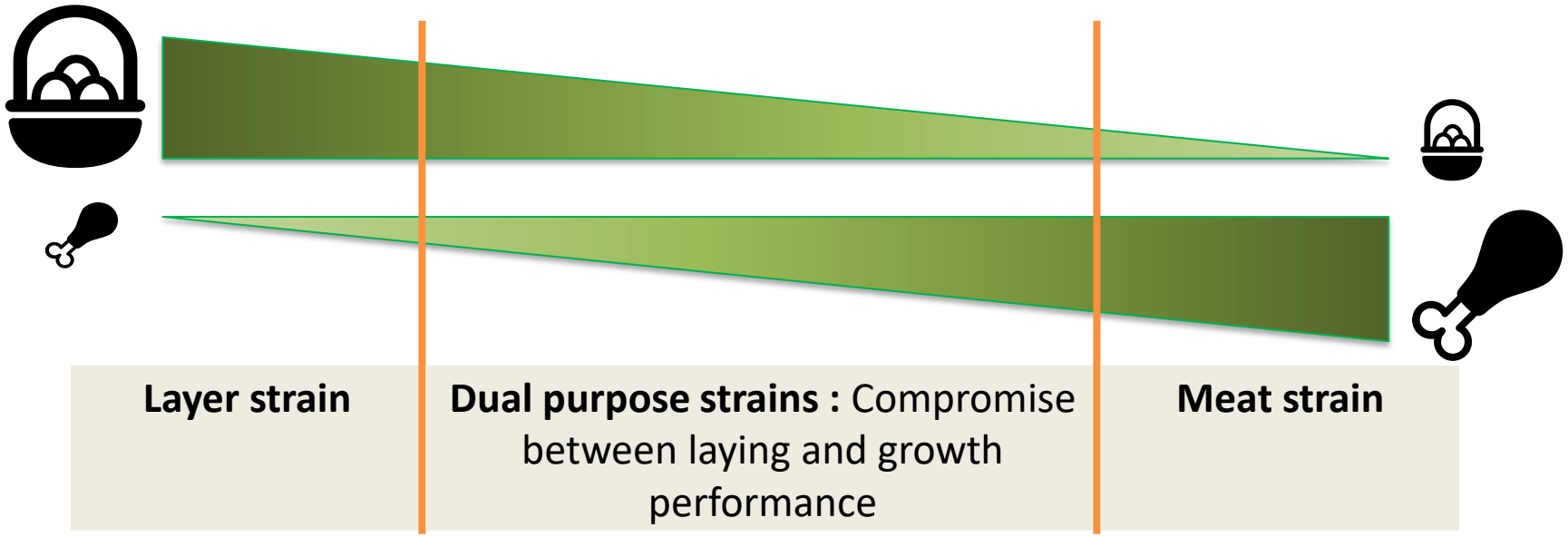
PPILOW Dual purpose genotype



- 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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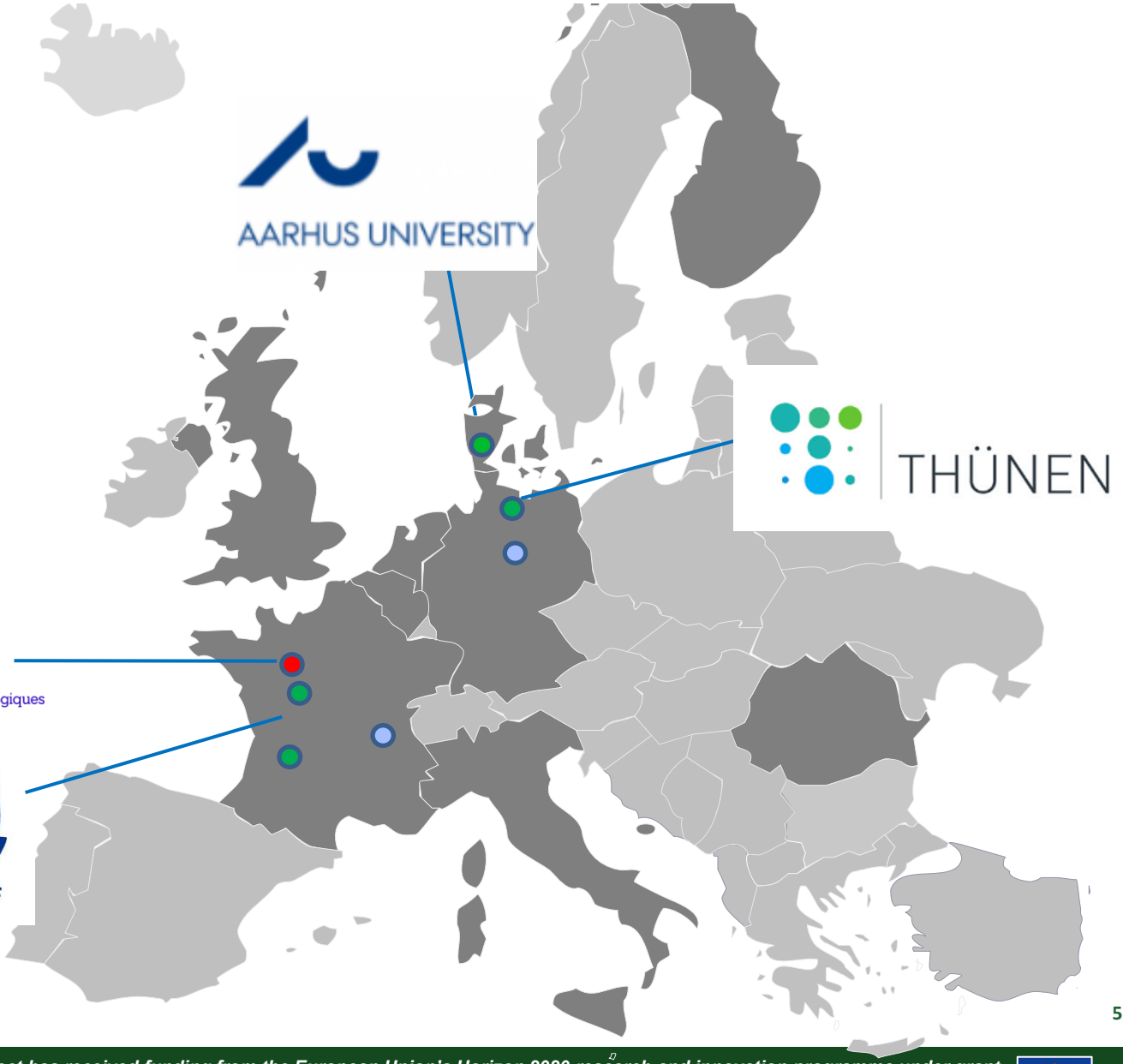
PPILOW Partners : trials on dual-purpose genotypes

- Farms involved
- Research institutes
- Technical institute



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Research on topics important to the **organic farming sector**

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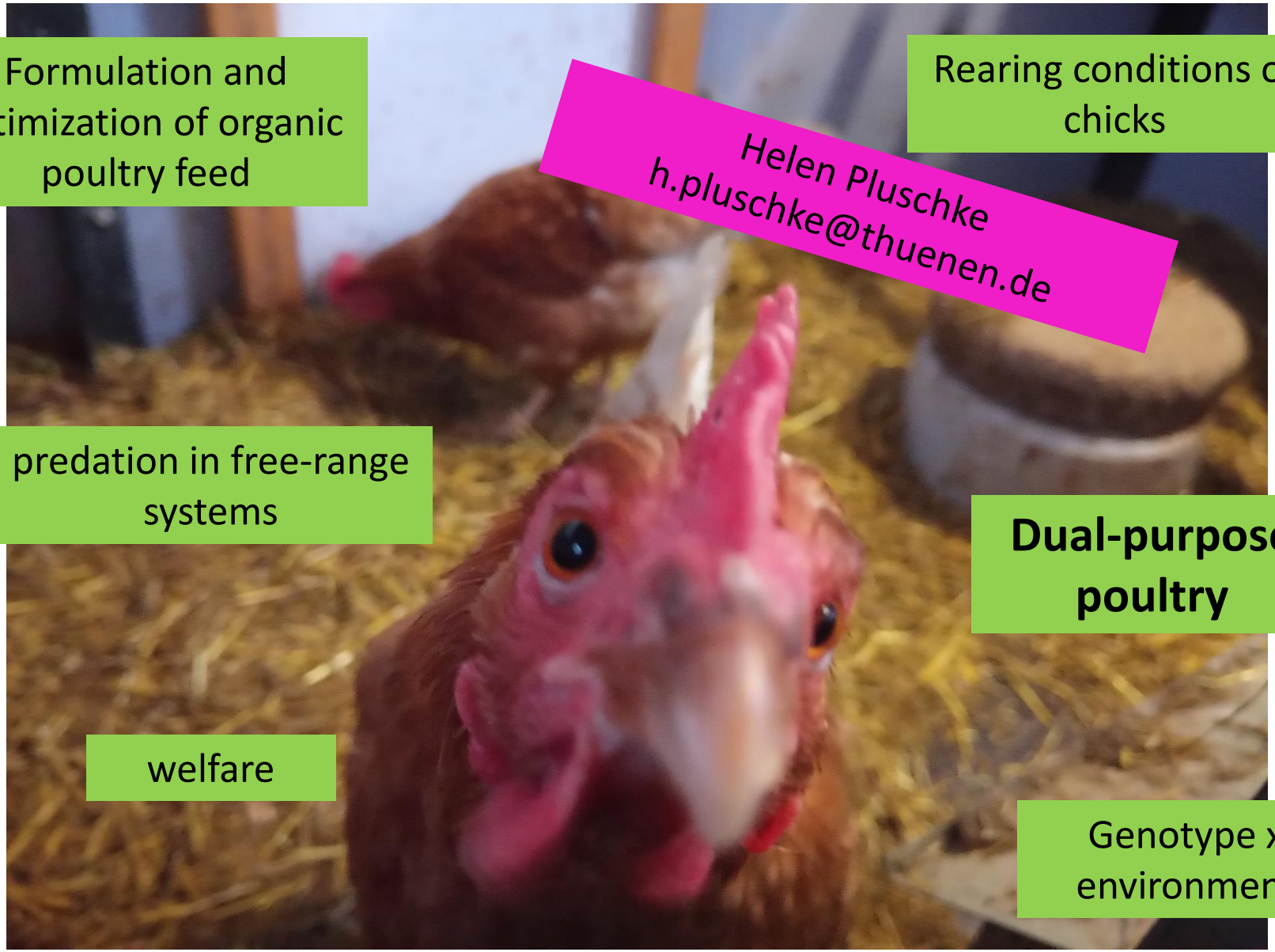

Formulation and optimization of organic poultry feed

Rearing conditions of chicks

Helen Pluschke
h.pluschke@thuenen.de

predation in free-range systems

Dual-purpose poultry

welfare

Genotype x environment

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Institut de l'Agriculture et de l'Alimentation Biologiques

→ French organic food and faming Institute

ITAB is a member of ITAB lab

Association pour la recherche et l'innovation Bio

ASSOCIATION FOR ORGANIC RESEARCH AND INNOVATION

8 facilities dedicated to organic research & innovation

> 50 staff members experts in organic farming

> 40 projects in France

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Institut de l'Agriculture et de l'Alimentation Biologiques

→ French organic food and faming Institute

Main teams :

- Livestock farming
- Product transformation and quality
- Crop production
- Sustainability and system approach

Transversal approach

Sarah Lombard

Agronomist, Mission head/Livestock (swine, poultry, rabbits)

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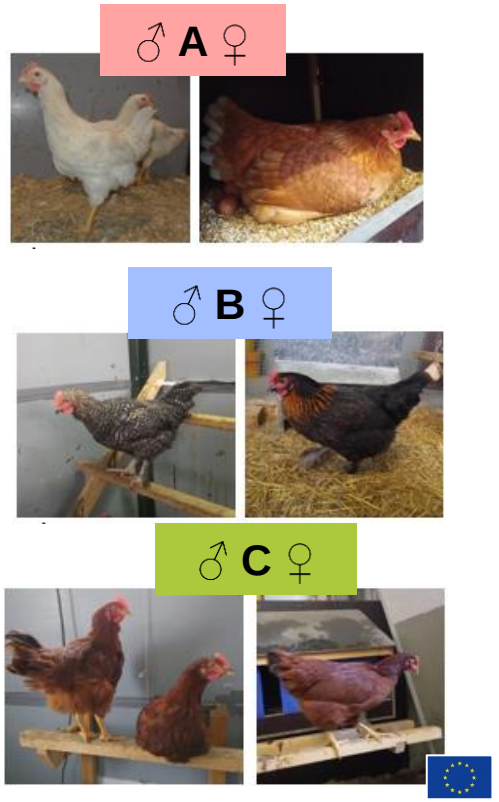
PPILOW Objectives

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

by Marianne Hammershøj [1,*], Gitte Hald Kristiansen [1] and Sanna Steenfeldt [2]

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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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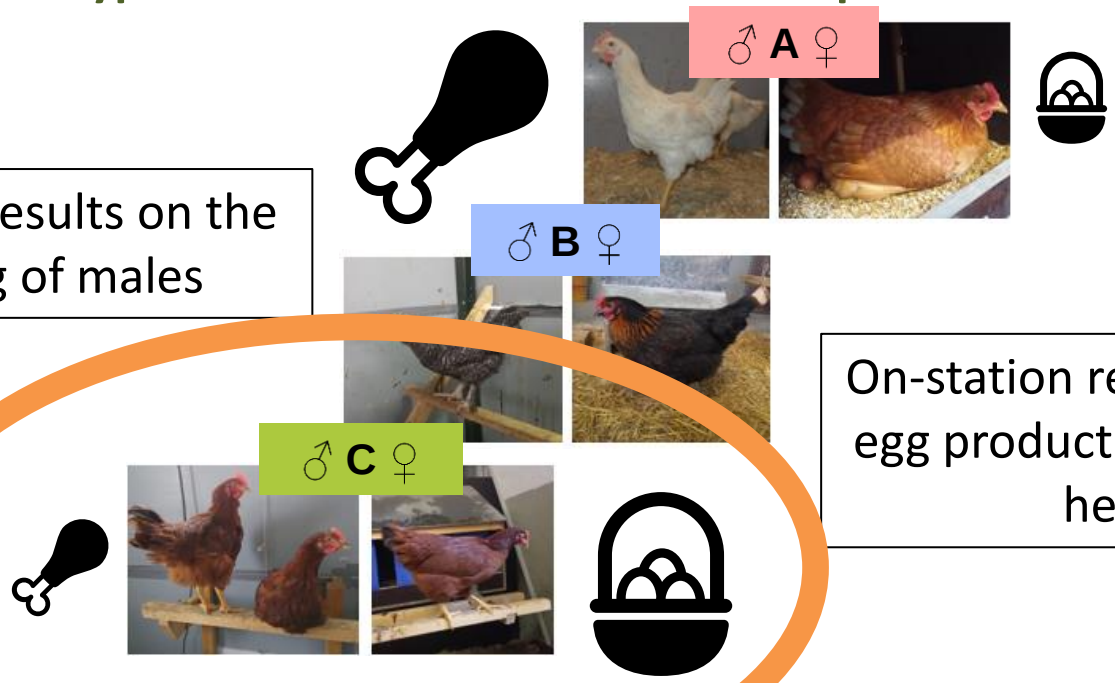
PPILOW Genotypes & National Practitioner Group decision

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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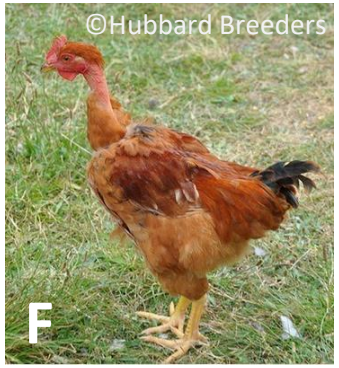
Different rearing conditions in France and Germany

	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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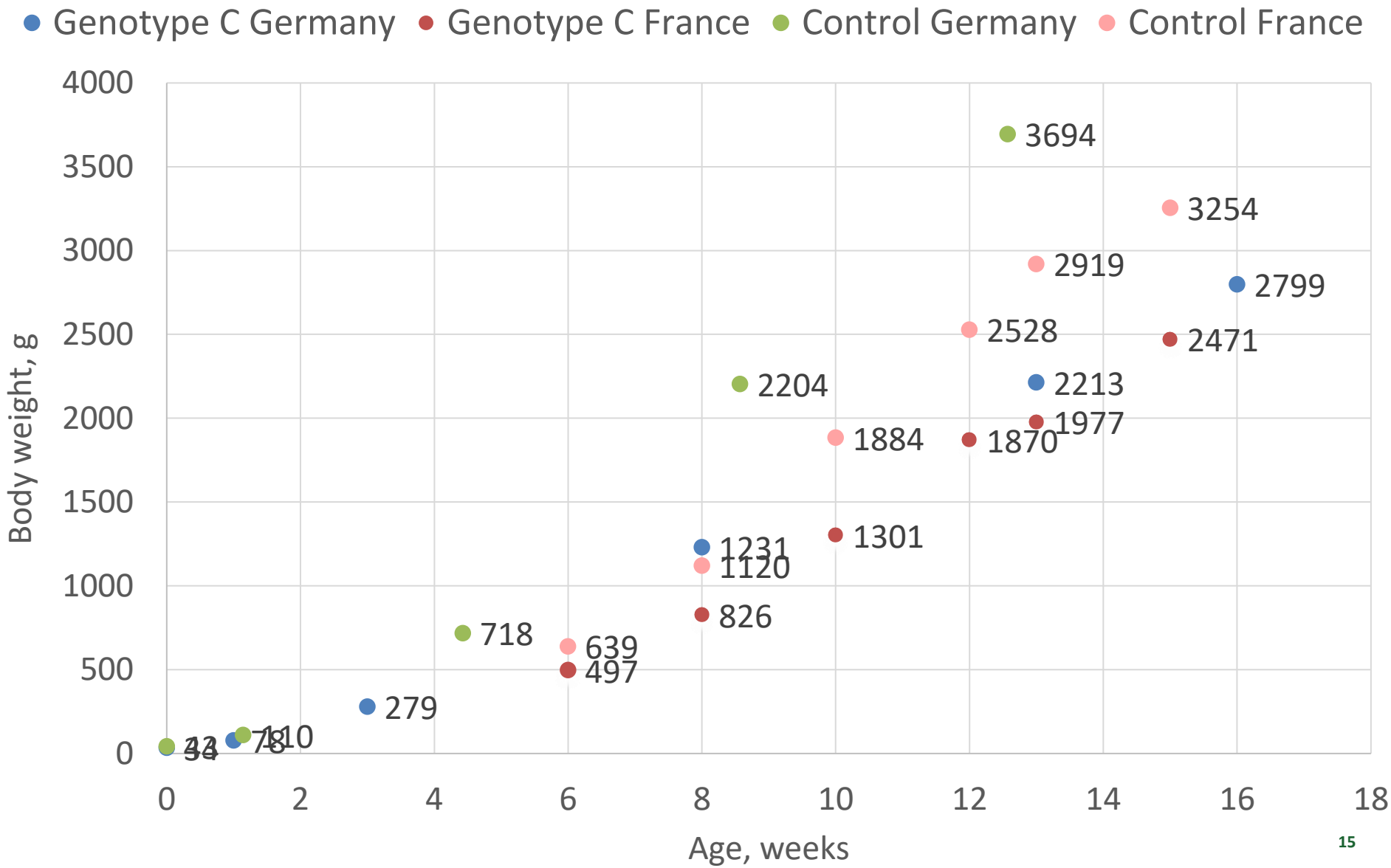
PPILOW On-farm trials results – Growth curves of genotypes



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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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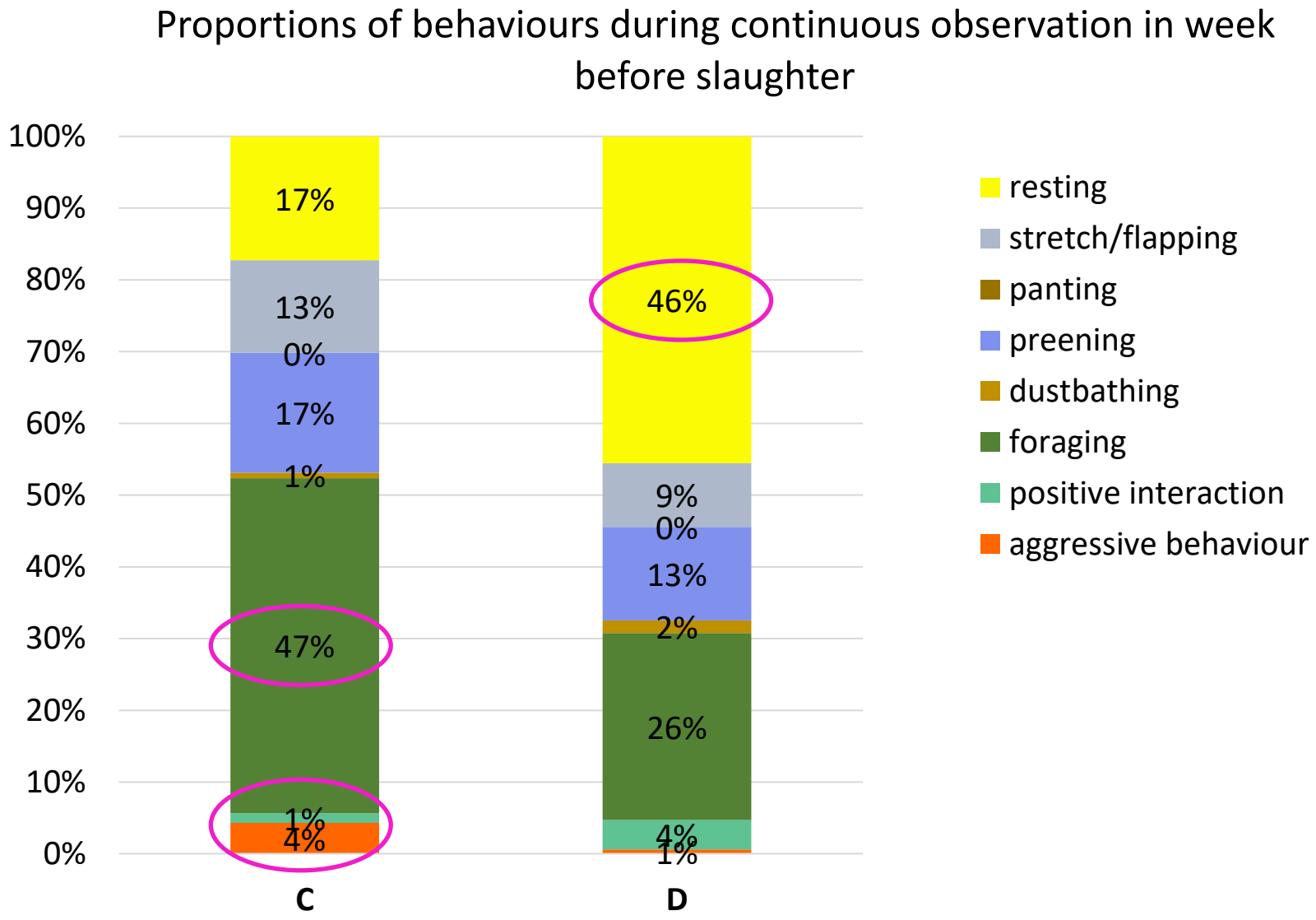
PPILOW On-farm trials results – Behaviour Observations in Germany



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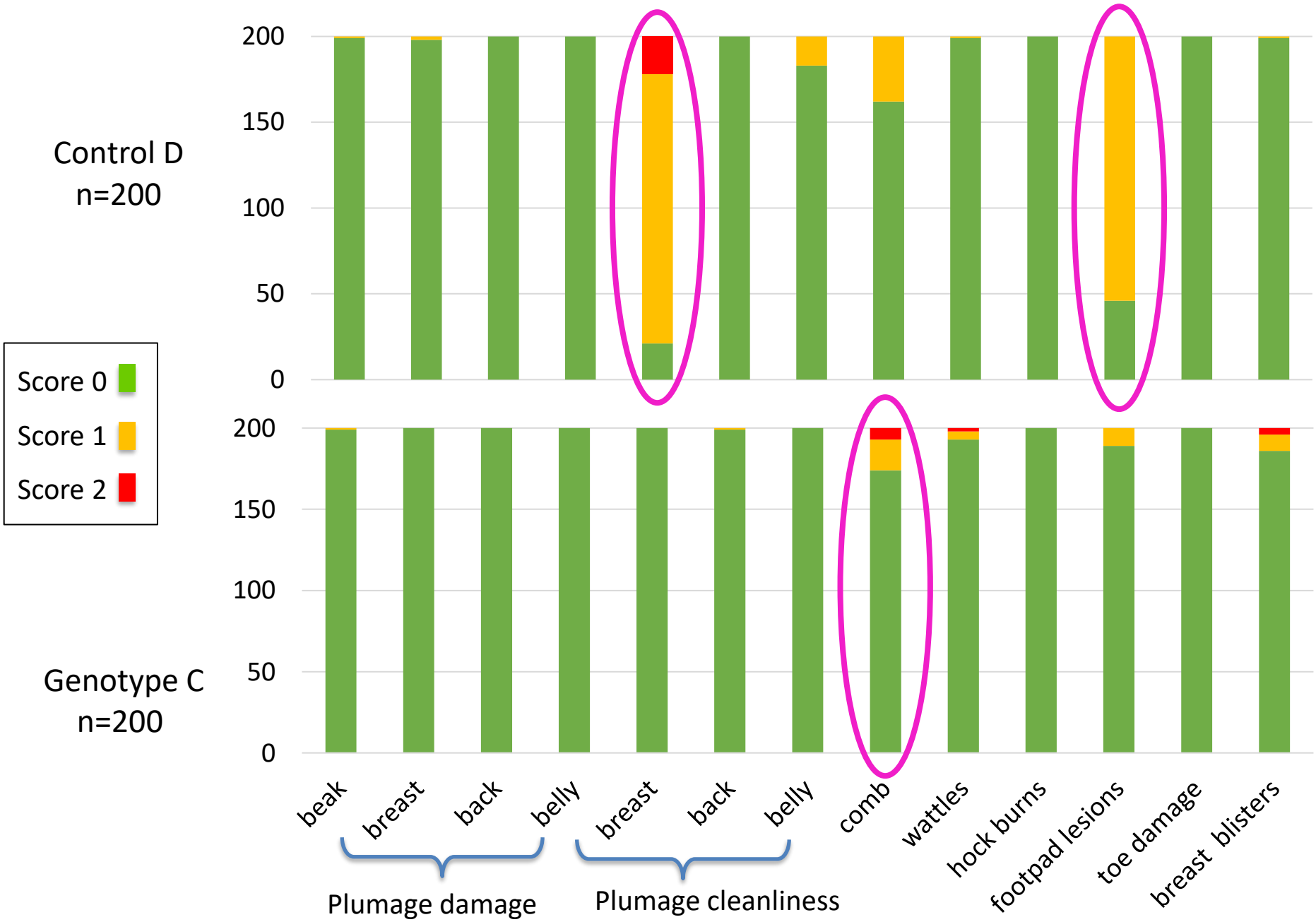
PPILOW On-farm trials results – Welfare indicators in Germany



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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PPILOW Conclusions

1. Longer fattening period with higher FCR → higher feed costs than control males

2. May be economically feasible if meat is sold at higher price

3. Perspectives :

   - Productivity of the females should be considered for a complete economic analysis of dual-purpose genotype: selling eggs a higher price?
   - Could males from dual-purpose genotypes valorize side products of the food industry to decrease feeding cost?

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PPILOW **PARTNERS**


Thank you for your attention

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