

Crossbreeding as an innovative way to preserve local chicken breeds through use in organic farming



Weigend, Steffen

Institute of Farm Animal Genetics,
Friedrich-Loeffler-Institut, Germany



03/2020 – 02/2028

10/2022 – 09/2025

Cooperative “Sister” Projects



Weigend, Steffen
Institute of Farm Animal Genetics,
Friedrich-Loeffler-Institut, Germany

Gefördert durch



aufgrund eines Beschlusses
des Deutschen Bundestages



U N I K A S S E L
V E R S I T Ä T

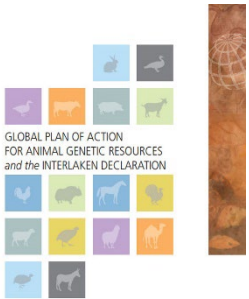


Background & Motivation



Local Breeds
Animal Genetic Resources

Organic farming
Appropriate Genotypes
*Dual purpose use, robust animal health,
product diversity*



International
FAO



Conservation through agricultural use

“In situ conservation measures are best based on agro-ecosystem approaches and, ideally, should be established through economically profitable and socially beneficial sustainable use.”



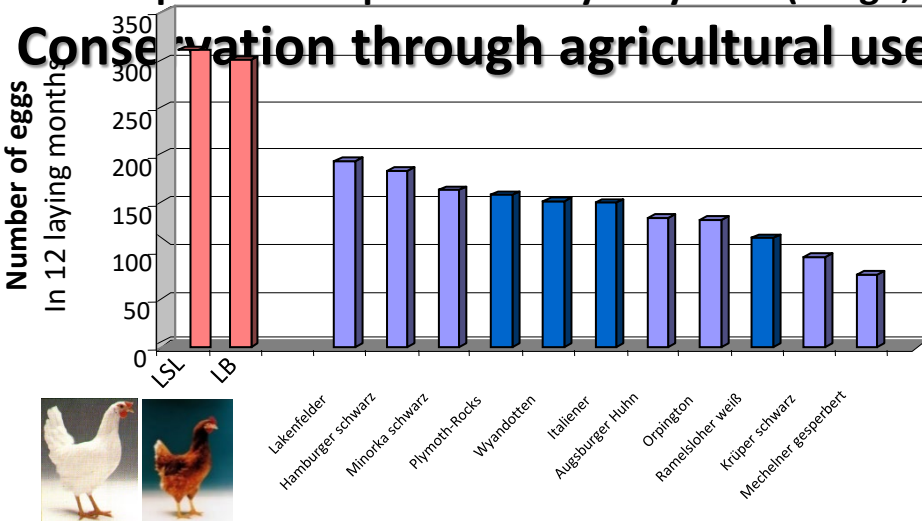
Germany

Background & Motivation

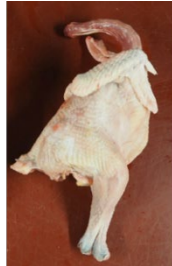
One major barrier to use local chicken breeds in the current agricultural production

Low performance level

Laying performance of old German chicken breeds
in comparison to specialized layer hybrids (Lange; 1995)



Ramelsloher



Carcass weight
14 weeks of age = Ø 956g
18 weeks of age = Ø 1283g

Situation for decades

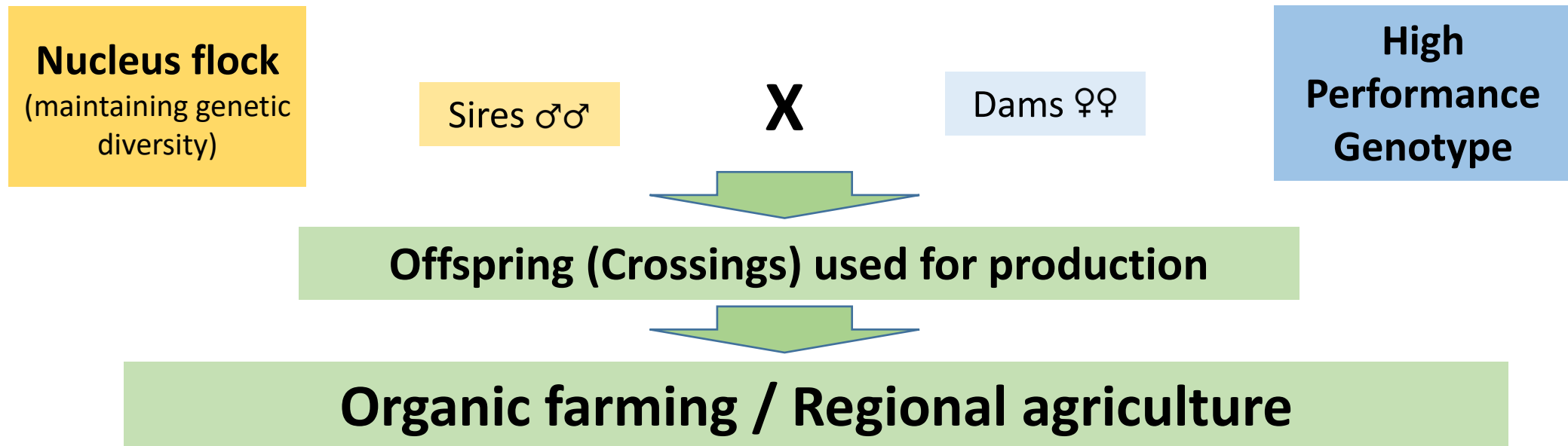
- No selection on performance
- No breeding flocks
- No performance testing

Project: **RegioHuhn**



➤ Concept

Crossbreeding of local breeds with high performance genotypes (layers and broilers) for use in today's agriculture.



Project: **RegioHuhn**

➤ Six local breeds



East Friesian Gulls (OFM)
Northern Germany *Ramelsloher (RAM)*

Western Germany *Bielefelder (BIE)*
 Malines (MEC)

South Germany *Altsteirer (ALT)*
 Augsburger (AUG)



Project: **RegioHuhn**

➤ **12 Crosses**

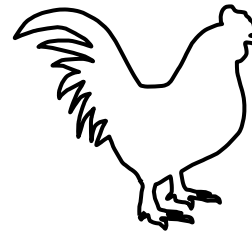
Sires of Nucleus herds



Northern Germany
East Friesian Gulls (OFM)
Ramelsloher (RAM)

Western Germany
Bielefelder (BIE)
Malines (MEC)

South Germany
Altsteirer (ALT)
Augsburger (AUG)



X



Lohmann Breeders GmbH

Laying Parental Hens
„Lohmann Brown“ (WR)



X



Aviagen

Broiler Parental Hens
„Ranger“ (RG)

LOHMANN
BREEDERS



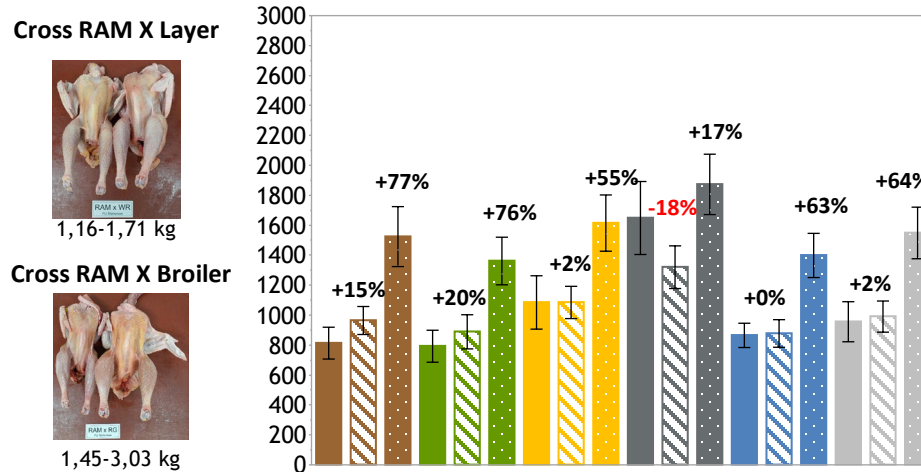
Performance Tests – Growth & Laying performance

Results: Comparison of purebreds and crossings

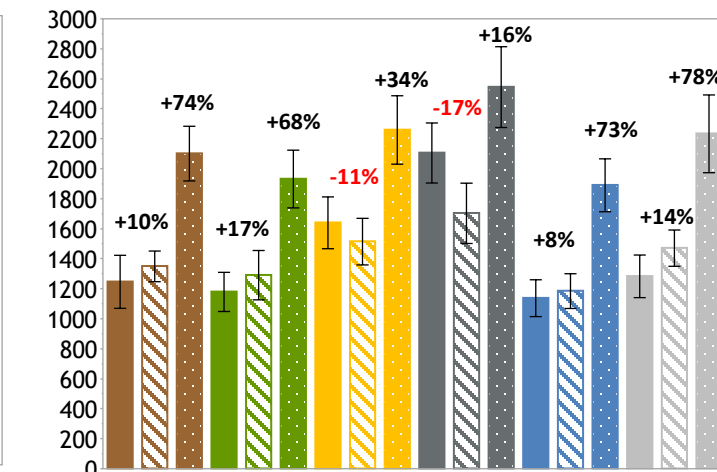
Meat Yield



Carcass weight of males of six purebreds and their crossings
14 wks of age



Ø Carcass weight in g	WoA	ALT	AUG	BIE	MEC	OFM	RAM
Pure breed	14	813	792	1085	1649	865	956



Ø Carcass weight in g	WoA	ALT	AUG	BIE	MEC	OFM	RAM
Pure breed	18	1246	1179	1640	2105	1137	1283

Layer - Crossings:
Ø + 4 %

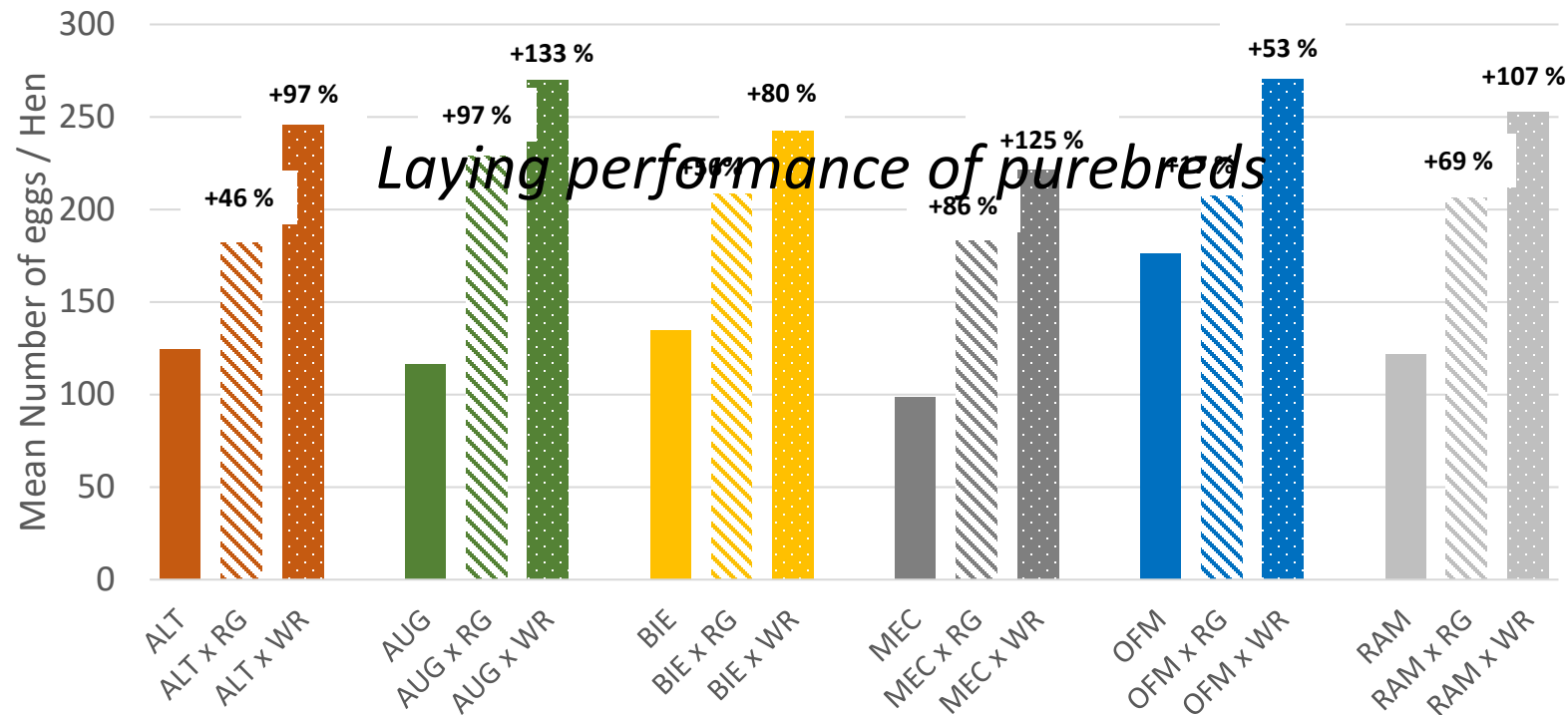
Broiler - Crossings:
Ø + 59 %

Layer - Crossings:
Ø + 3 %

Broiler - Crossings:
Ø + 57 %

Results: Comparison of purebreds and crossings

Laying performance (20 to 72 wks of age)



Broiler - Crossings:

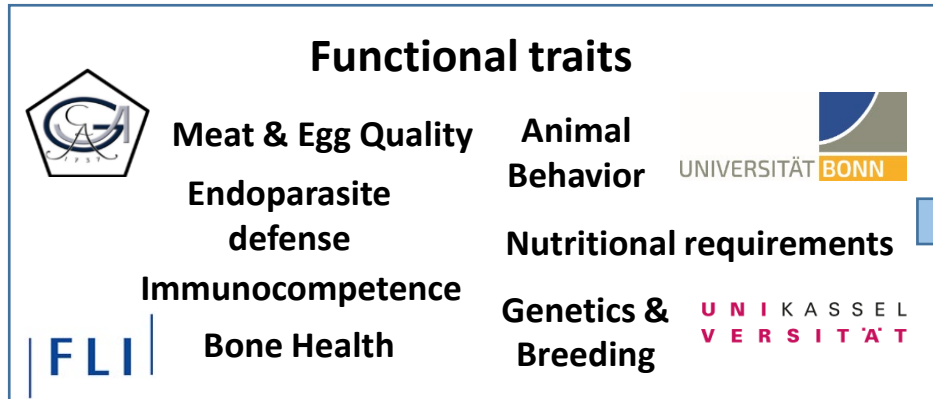
Ø + 62 %

Layer - Crossings:

Ø + 99 %

Project: RegioHuhn - combined with „OekoGen“

RegioHuhn (1. Phase)



Growth /Slaughter & Laying performance

Animal Welfare & Behavior

First field tests

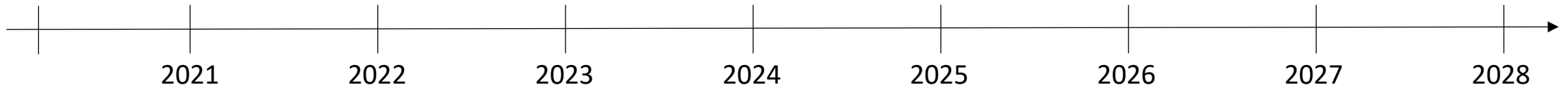
Nucleus & Multiplier Herds



ÖkoGen

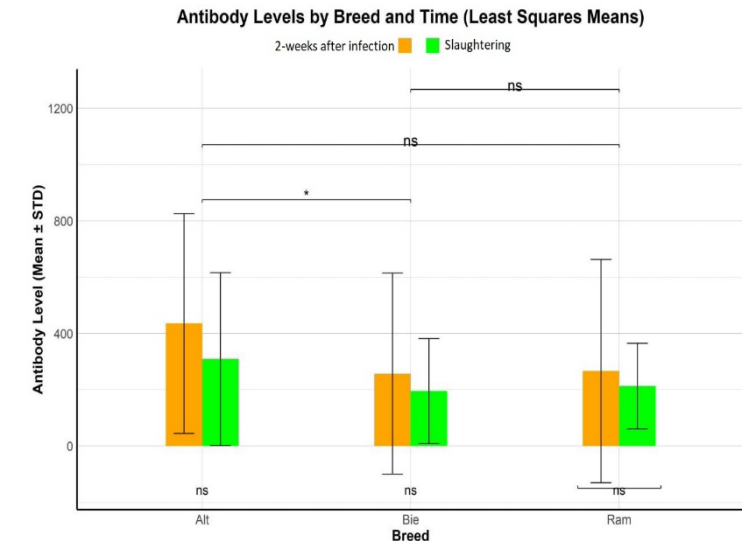
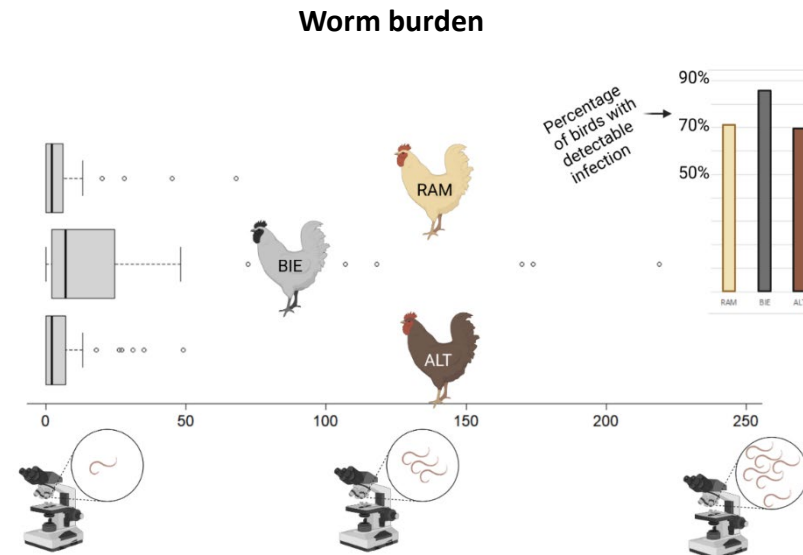
Two Snapshots

- Experimental infections with *Ascaridia galli*
- Welfare Assessment:
 - Feather score – cloacal region
 - Keel bone deformation (palpation)



Experimental infections with *Ascaridia galli* in the local chicken breeds Bielefelder (BIE); Ramelsloher (RAM), Altsteirer (ALT)

- 60 (Inf) vs 60 (Con) per breed
- Infected at **8 weeks of age** with 1000 *A.galli* eggs/bird
- ELISA to quantify *A.galli* specific antibody levels at 2 & 7 wpi
- **Intestinal worm** count collected post-slaughter (eggs per gram)



The **parasitic load** differed significantly between breeds (P-value < 0.05).

Significant differences in **antibody response** between breeds (P-value < 0.05)

- ✓ **ALT** has highest antibody level (Strong immune response)
- ✓ **BIE** highest worm burden but low antibody level

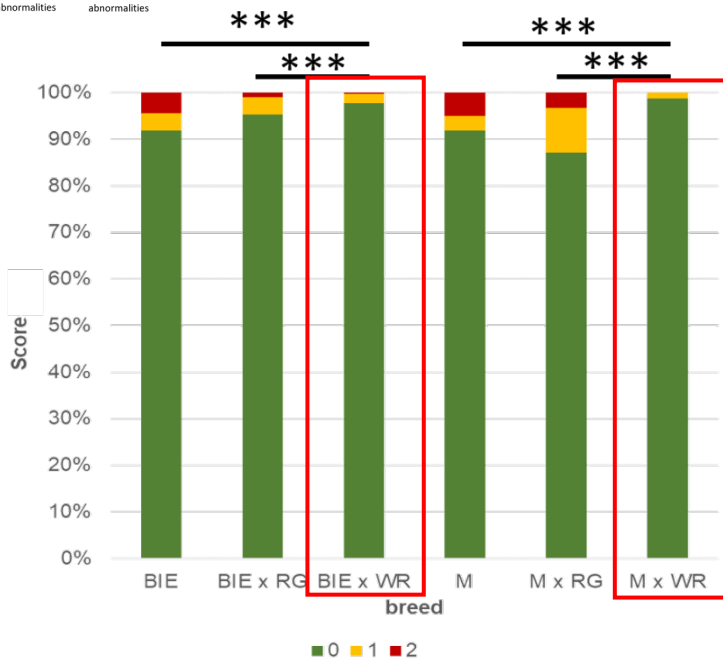
Welfare Assessment:

Feather score – cloacal region & Keel bone deformation (palpation)

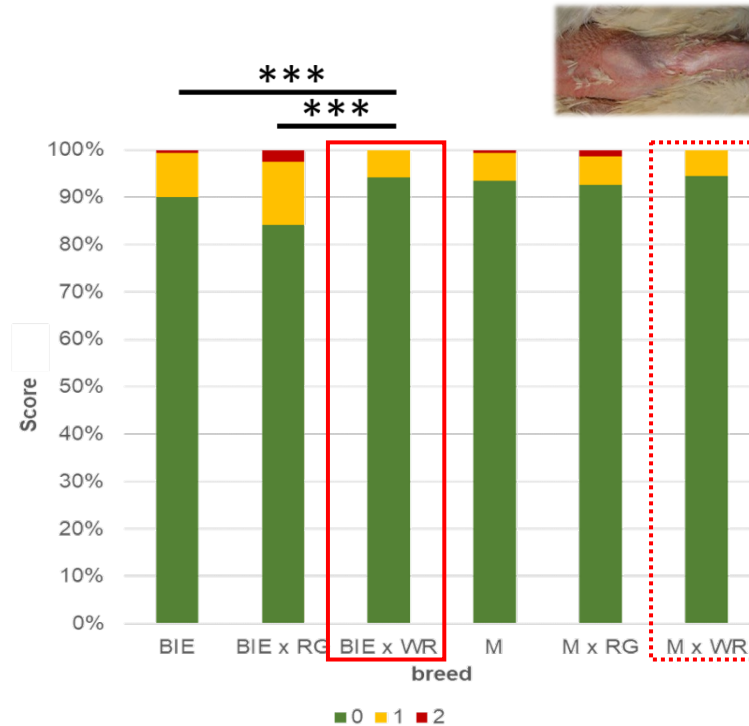
in the local chicken breeds Bielefelder (BIE) and Malines (M) & Crosses with WR and RG

Feather score – cloacal region (avg. Score 2-36&72 WOA) Keel bone deformation (avg. Score 2-36&72 WOA)

0 1 2
No Slight Severe
abnormalities abnormalities abnormalities

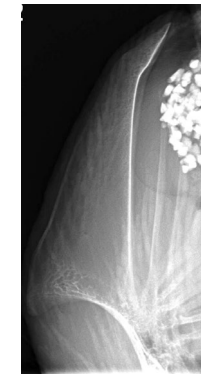


Less feather damage in layer-type crossbreds.



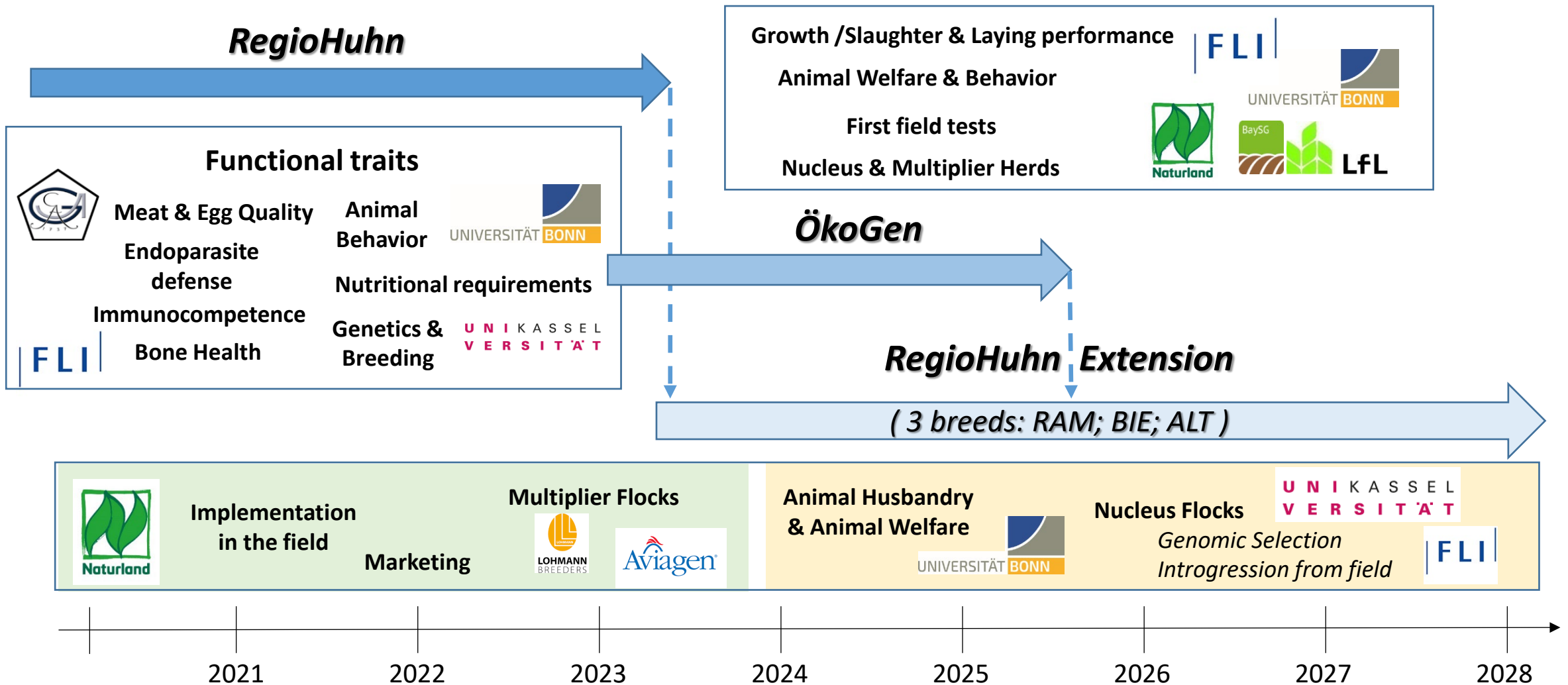
Less keel bone damages in BIE-layer-type crossbreds.

Detailed study on bone health in progress



FLI

Project: RegioHuhn - will go on





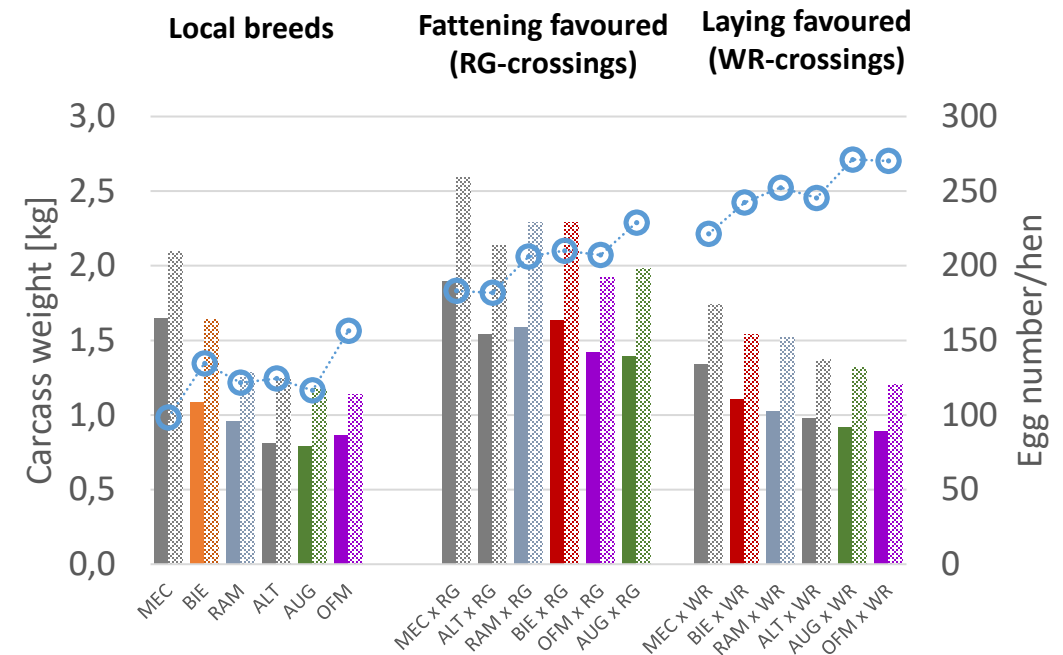
Conclusion

Crossbreeding is a practicable way of preserving local breeds through use of crossbred offspring in organic agriculture



Crossbred offspring

- ☐ **improved performances** - Performance is crucial for the farmer
- ☐ **provide diversity for use** - Meat- or laying- oriented use
- ☐ Suited for **dual-purpose use**



Carcass weights in the 14th (bar, full) and 18th week of life (bar, hatched) and the laying performance per average hen (DH, points) from the 20th to 72nd week of life



Conclusion

Crossbreeding is a practicable way of preserving local breeds through use of crossbred offspring in organic agriculture



Thank you for your attention

Partners

FLI

- Steffen Weigend
- Nina Götzke
- Christian Reimer
- Chi Mei Sun
- Ulrike Blohm
- Luise Feyer

University of Bonn

- Inga Tiemann
- Sonja Hillemacher
- Josefine Stuff

LfL

- Philipp Hofmann

University of Göttingen

- Jens Tetens
- Alexander C. Mott
- Daniel Mörlein
- Antje Risius
- Claire Siebenmorgen

Naturland – Öko Beratung

- Werner Vogt-Kaute
- Pauline Eichenseer
- Johanna Krebs

University of Kassel

- Dirk Hinrichs
- Maximilian Volk
- Margret Krieger
- Faizan Haider