

# The nutrient value of rye – a field study with boars, barrows and gilts in Germany

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SEEDING  
THE FUTURE  
SINCE 1856





# Pig production – current challenges

- Bureaucracy
- ...castration without anesthesia...
- New tail renunciation regulation
- Future housing conditions for German sows
- Higher standards/costs due to the future housing conditions of the food retailing and the German government?
- African swine fever



# The national animal welfare labeling for pigs is coming soon (02/2019)



Criteria of the 3 levels compared to the official minimum Standard

Criteria	Official Minimum Standard	First Level	Second Level	Third Level
1. Space (qm) LW (kg) 5-10 kg 10-20 kg 20-30 kg 30-50 kg 50-110 kg > 110 kg	0.15 qm 0.20 qm 0.35 qm 0.50 qm 0.75 qm 1.00 qm	20% more space	Ø 47% more space	Ø 91% more space from 30kg on run officially required
2. raw fodder and activity material	Activity material officially required raw fodder not officially required	Permanent access to raw fodder, activity material with organic burrow possibility.		
3. Pen Structure	No requirement regarding structure so far, most pigs are living on fully-slatted floor	Pens have to be structured, the pigs should choose between different areas (food, sleep, activity). Structured by balconies e.g.  Closed, soft or inter- persed sleeping area as well as fresh air charming Pens with run, largest part with closed floor, interspersed sleeping area		

Bioland warnt Klöckner davor, für die aus Sicht des Tierwohls unzureichende Einstiegsstufe, Prämienzahlungen pro Schwein an die Landwirte zu zahlen. Geplant sind Zahlungen von insgesamt über 100 Millionen Euro. „Die Gelder für mehr Tierwohl müssen gezielt an diejenigen Betriebe fließen, die ein besonders hohes Niveau einer artgerechten Nutztierhaltung umsetzen und entsprechende Stallsysteme um- oder neubauen“, so Plagge.



## Tierwohlkennzeichen

### "Wir machen mehr Tierwohl sichtbar"

Julia Klöckner stellt die Kriterien des staatlichen Tierwohlkennzeichens vor - und erntet Kritik von Bioland.



## Vermarktung

### Bioland kooperiert mit Lidl

Kunden des Discounters Lidl können nun Bioland-Produkte kaufen.



## LEH

### Lidl und Bioland arbeiten zusammen

Die zwei ungleichen Partner sehen große Chancen in ihrer Kooperation. Fair-Play-Regeln sollen Bioland-Landwirten Sicherheit geben.



## Tierhaltung

### Tierwohlkennzeichnung - scharf geschossen

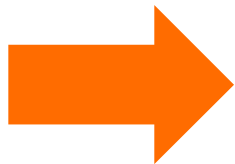
Auffällig ist, dass es schon wieder der Einzelhandel ist, der die Pflöcke einschlägt.

# The long-term perspective...

Dominant questions for foods as well as tasks for politics and agricultural research after the second world war in Europe (Flachowsky, 2003)

## Questions/tasks

Consumer	I am hungry	I have an appetite	I am worried
	Is there anything to eat?	What is there to eat?	How safe is the food?
Politics	<b>Food security</b>	<b>Food quality</b>	<b>Food safety</b>
	granting sufficient food	reduce of surplusses	
Agricultural science	Agricultural production	Quality research	Safety research
	increase	product quality	
	Use of all ressources	Process quality	
		to go easy on resources	
	1945 ↑ 1950	1960	1970
		1980	1990
			2000
	FAL Founding		



- Ban of active ingredient
- Fertilizer regulation
- Animal welfare
- Water protection
- Emission protection
- Bees protection
- ...



## Additional pricing pressure on the part of the food retailing

Do not save money at the hair-dresser.



Save money at Netto!



This way animal welfare and sustainability will be difficult!



# Agenda – approve the animal welfare with feed



## Character of rye

### **‘the field study‘**

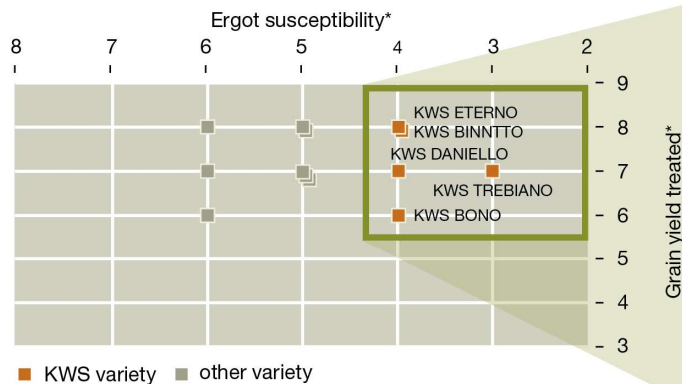
- Background of the issue stomach/gut health and animal welfare of pigs (University of Veterinary Medicine Hanover, Foundation)
- Test description of the implementation together with the „Viehvermarktung Walsrode eG“
- Results of
  - Feed analyses
  - Performance data
  - Carcass data
  - Findings
    - Salmonella and
    - Boar taint



# POLLENPLUS® hybrid rye: ergot resistance



## Ergot susceptibility and grain yield classification



\* Character level 1 = absent or very low ergot level, level 9 = very strong/high ergot level, hybrid varieties registered as of 2010 (German Descriptive variety list 2018)

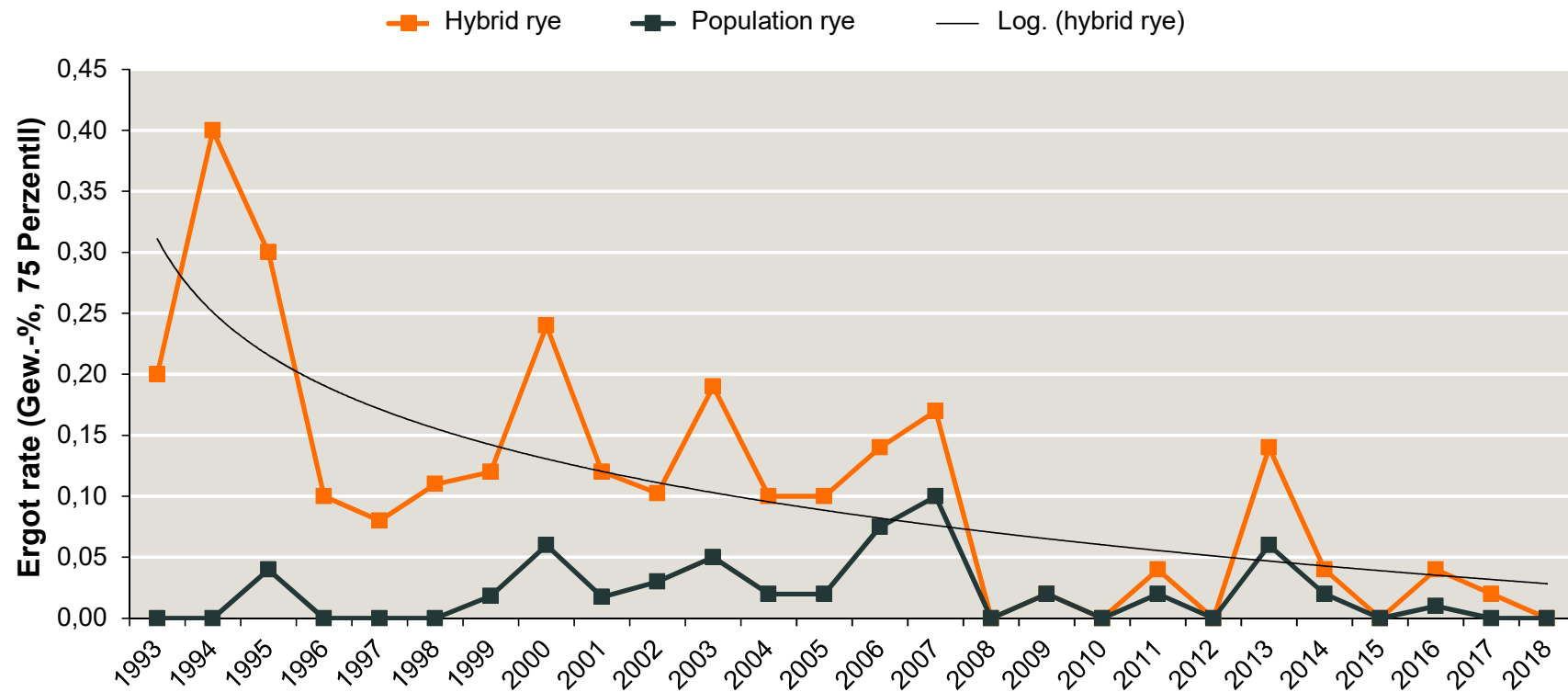
## POLLENPLUS® hybrid rye: ergot resistance



Grain yield results (rel.) of KWS internal plot trials 2017 – 2018, based on the medium of the treated and untreated level, no. of locations = 31, rel. 100 = medium of the control varieties KWS BONO and KWS DANIELLO, ergot resistance of the POLLENPLUS® hybrids estimated by KWS LOCHOW 2018

<sup>1</sup> Ergot classification: German Descriptive variety list 2018, level 4 = low to medium, level 3 = low

# Development of the ergot problems since 1993



Source: MRI Besondere Ernteermittlung 1993-2018, Populationsroggen und Hybridroggen



# Realization of the field study together with the Viehvermarktung Walsrode-Visselhövede eG



# Trial description and results of the field study until 30/6/2018



- 14 pig farmers of Viehvermarktung Walsrode e.G.
- **12,761** fattening places (67.119 pigs), **8 farms with boars** (46,061 boars)
- Different feeding systems
- Boars, sows und castrated male pigs
  - PIC-, Victoria-, DAN- \* PI
- Data:
  - Performance data
  - Feed data
  - Carcass data
- Feeding concept:
  - Coarse grinding (max. 20% < 0,25 mm)
  - **40% Rye + 25% Barley in the finisher diet** III > 80 kg (5% I; 20% II)
  - Relation of lysin/energy min. 0,75 in the finisher phase.

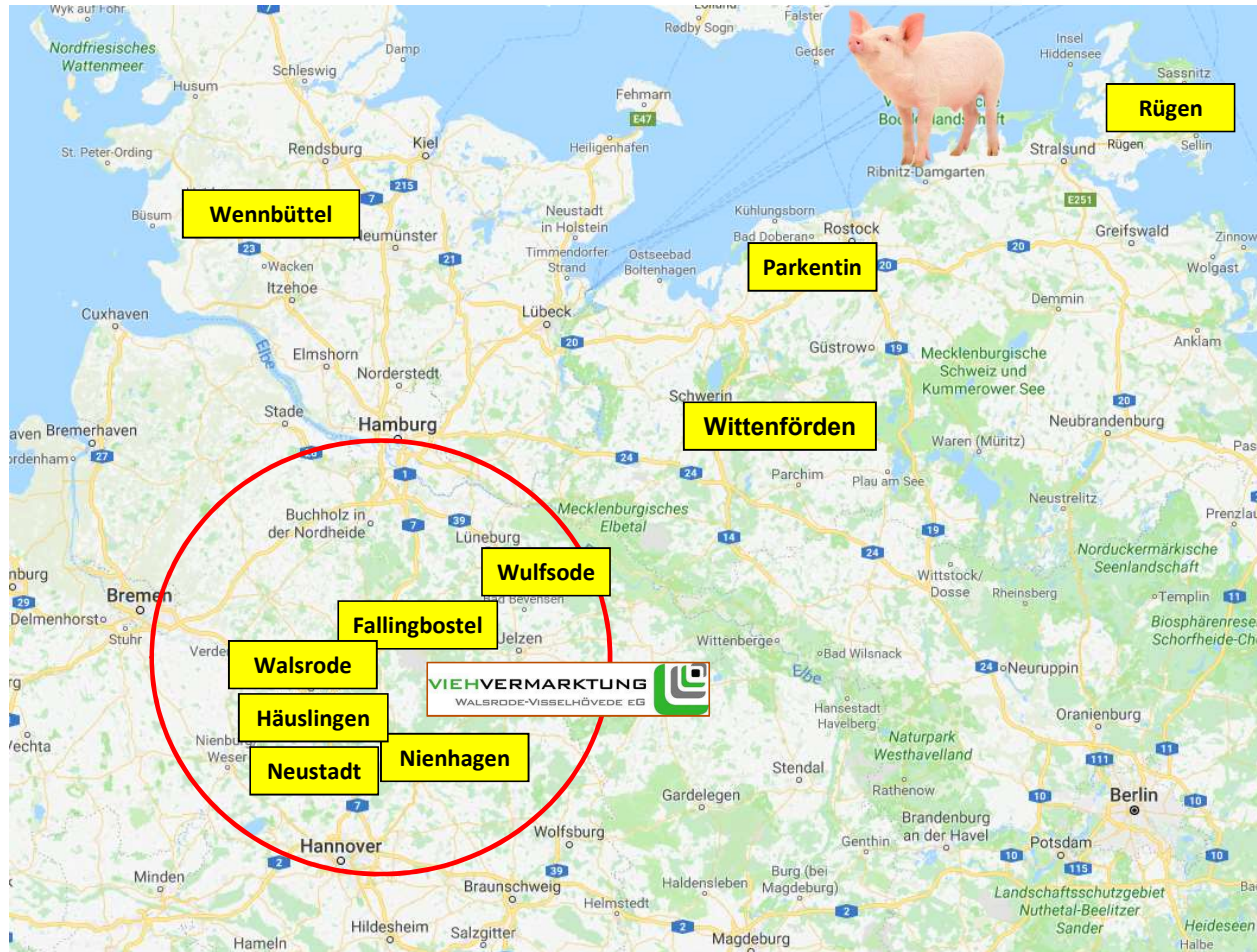


# Slaughter pigs commercialization





# Piglets commercialization



# Feed analyses results of the Field Study



The fructan level of rye is twice as high as of other cereals

Cereals (88% DM)	Energy MJME (MJ/kg)	Protein (%)	Fructan* (%)	Crude Fiber (%)	Arabinoxylan, sol. (%)
Wheat	13,9	10,4	3,2	2,4	0,93
Barley	12,2	9,8	2,8	5	0,8
<b>Rye</b>	<b>13,6</b>	<b>8,2</b>	<b>7</b>	<b>2,4</b>	<b>2,18</b>
TRITICALE	13,6	9,8	3,8	2,2	0,8



Own results (KWS LOCHOW, 2017) n= 38 \*HPLC measured on basis of chicoree, LKV Saxony

# Fructan content of the already produced mixed fodder samples in specific fattening sections



At the end of the testing period the fructan level of the mixed fodder samples was at approx. 6%.

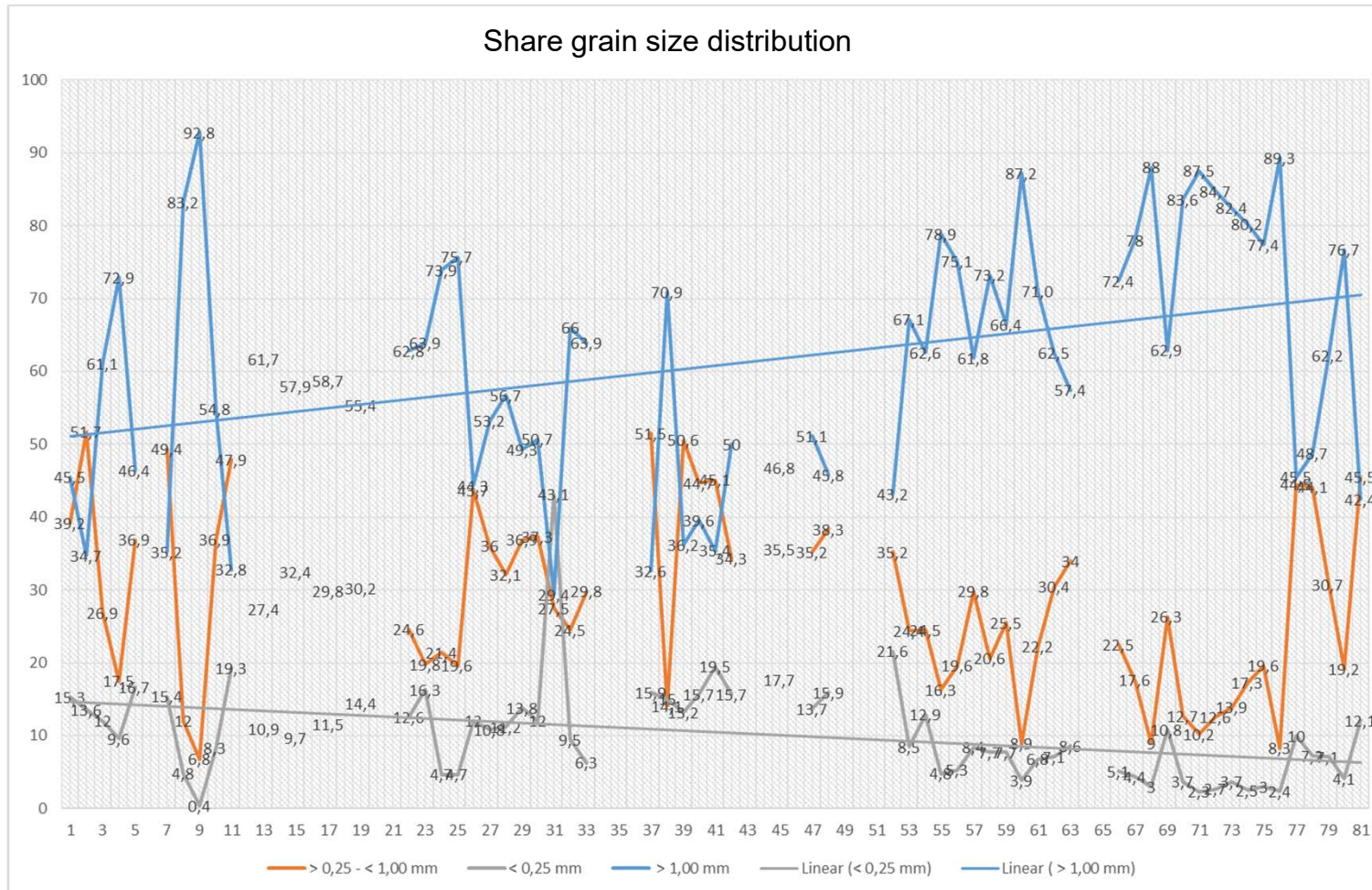
% Fructan (88% DM)	PF 30-50 kg	MF 50-80 kg	F 80-120 kg	Remarks
Quarter I 2017	3,5	4,2	4,2	Wheat - triticale based mixtures
Quarter II 2017	5,4	5,9	6,2	Mixtures with increased rates of rye
Quarter III 2017	5,9	6,1	6,5	Rye based mixtures

Feed concept	PF 30-50 kg	MF 50-80 kg	F 80-120 kg	Remarks
Energy MJME (MJ/kg)	13,6	13,4	13	Isocaloric for wheat - triticale and rye based mixtures
Protein (%)	16	15,5	14,5	Same for wheat - triticale and rye based mixtures

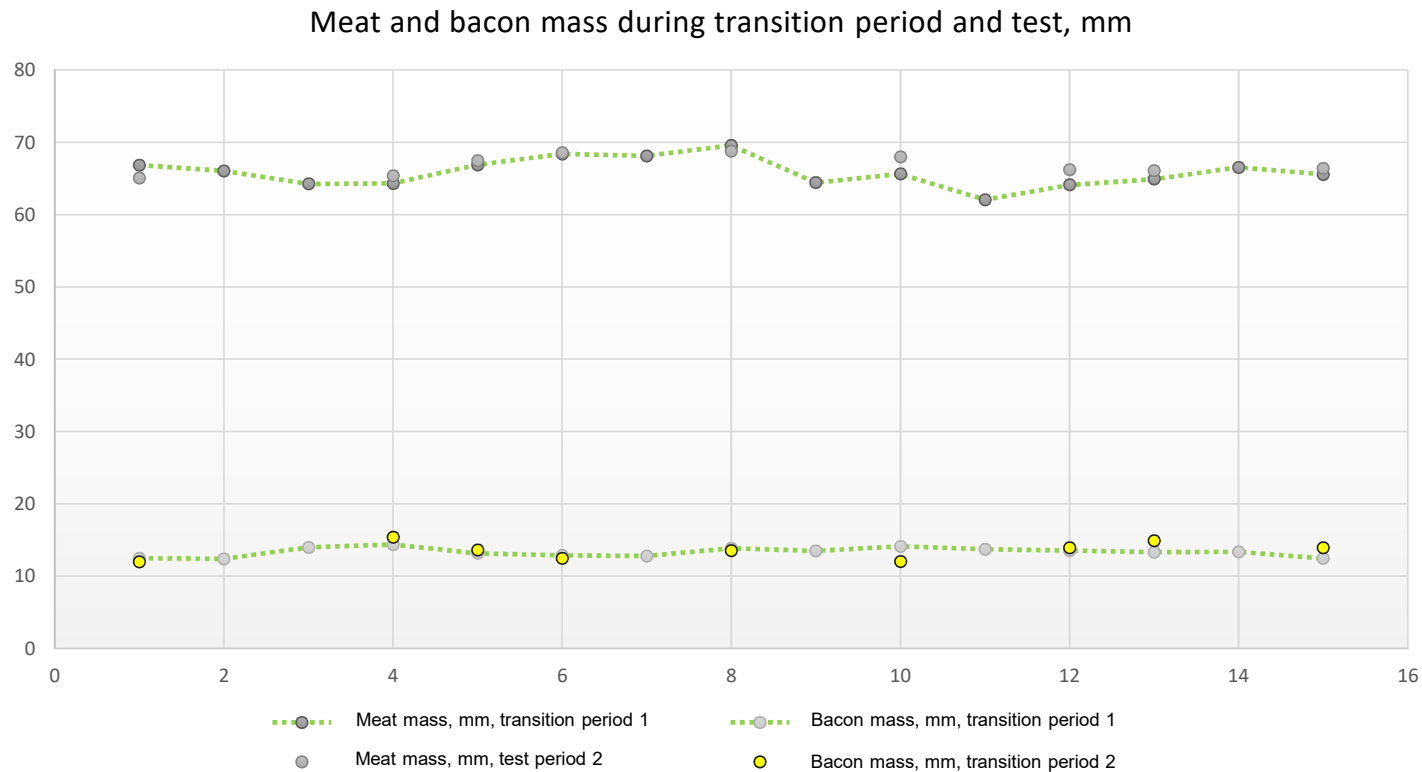
Own KWS LOCHOW data (2017) n= 45



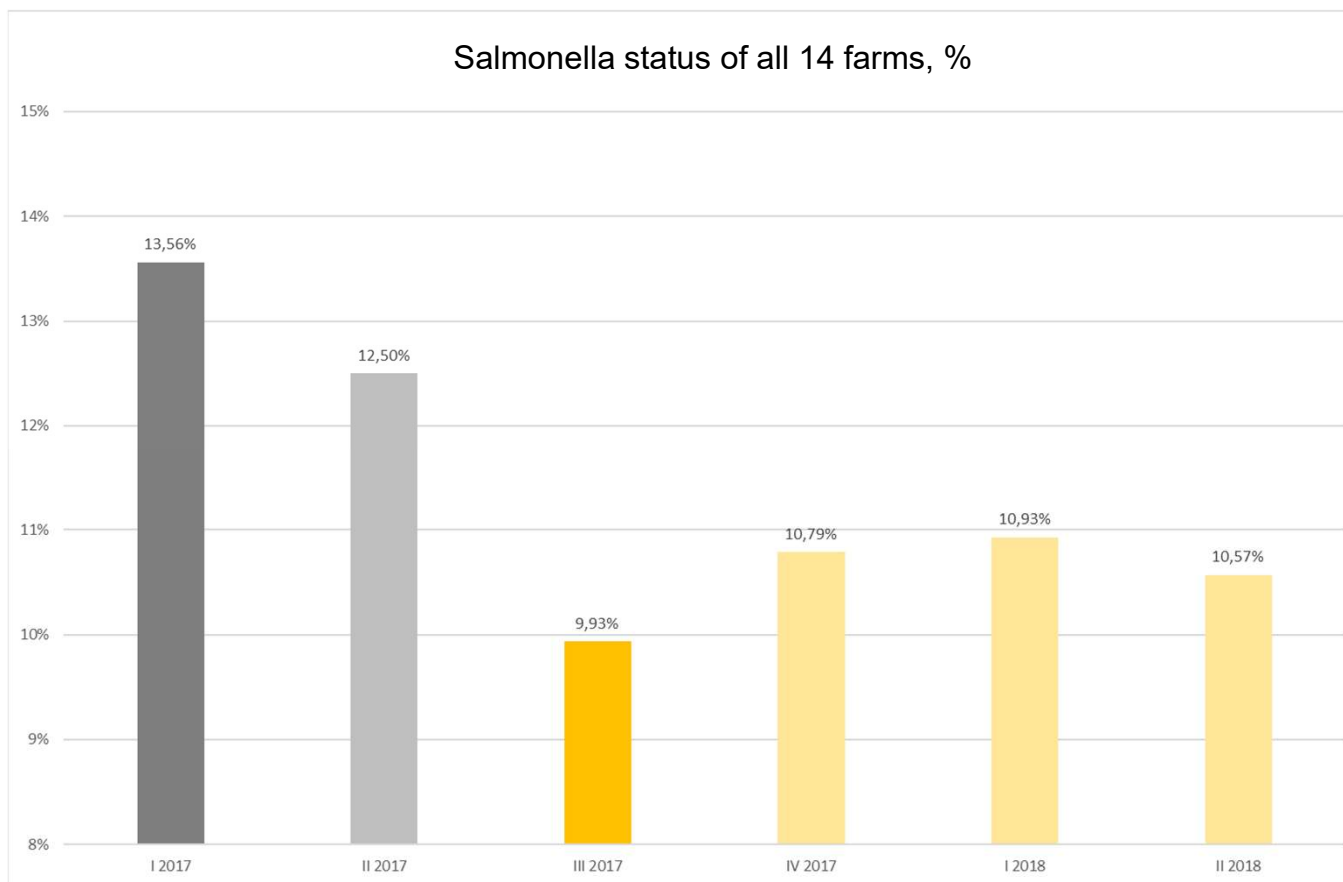
# Development of the milling characteristics between 1. und 81. sample (MIFU and home mixer) over time:



# Carcase mass with good accordance and characteristics with other practice (rel. average data, n=27.303)



## Salmonella status of all 14 farms within the testing period until 30/6/2018 (n=67.119):



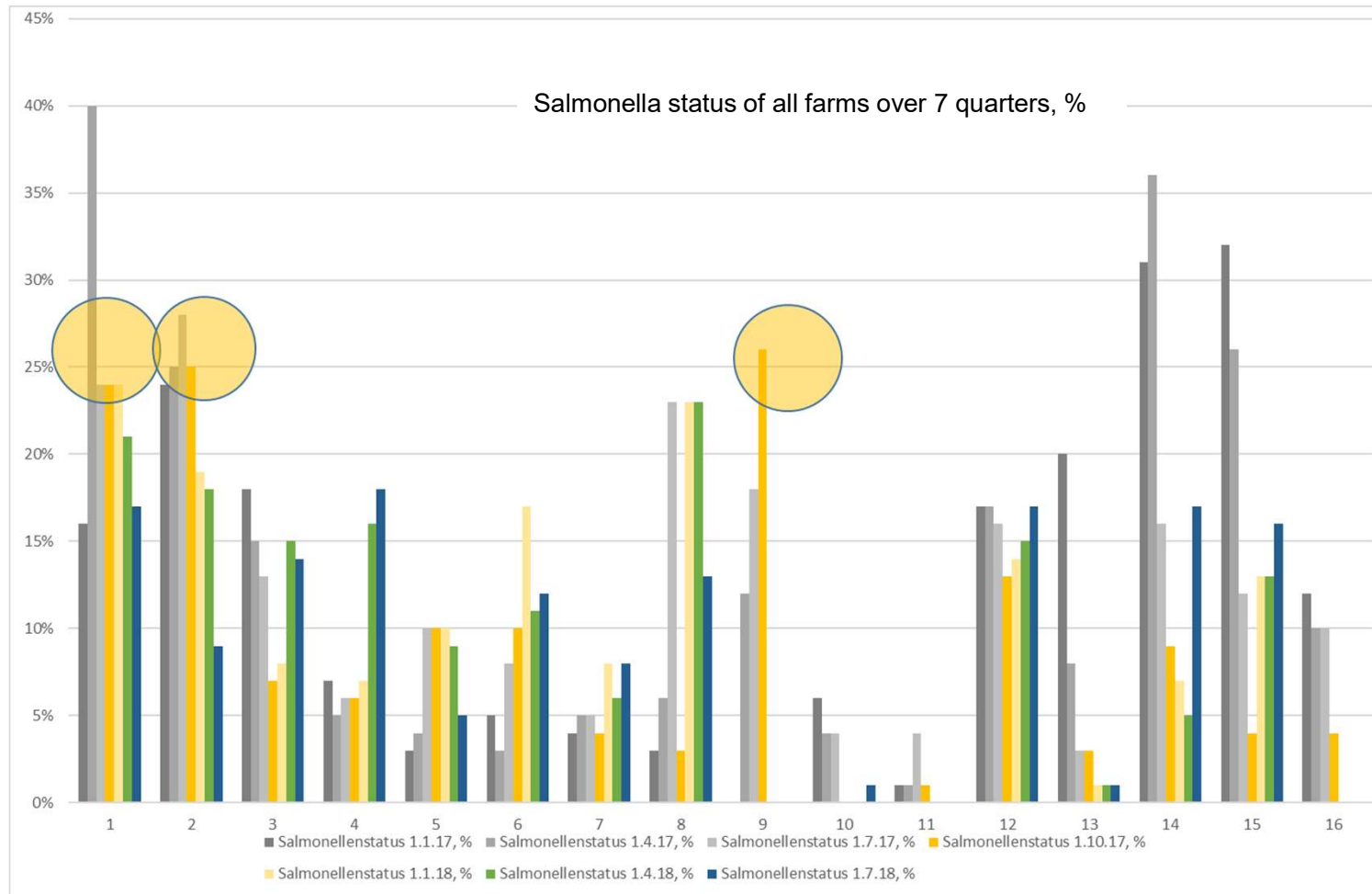


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**RC(D [2]1** Reinke, Claudia (KWL, DEWO), 01-Mar-19

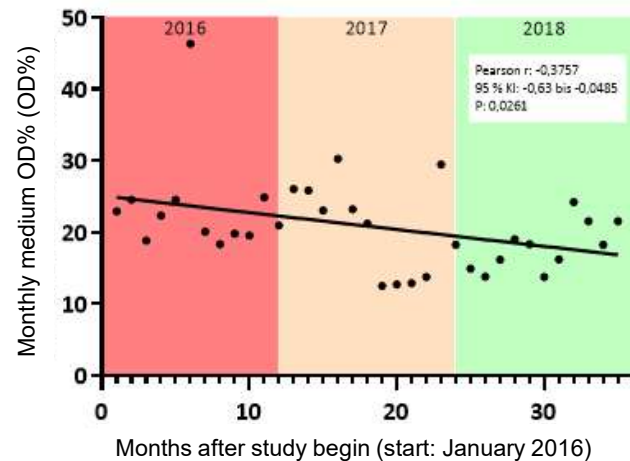
# Salmonella status of all farms over 7 quarters



## The scientific accounting shows the significant salmonella reduction by rye and coarse-milled in the test



- 1,481 meat juice and 1,289 blood sample



Description of the medium values in the testing period. Implementation of the rye based feed concept in the first quarter 2017

**Tabelle 2:** Vergleichende Darstellung der serologischen Ergebnisse für die Jahre 2016 (vor Etablierung des neuen Fütterungskonzeptes), 2017 (Übergangs- und Testphase) und 2018 (Fortsetzung der Testphase) aus der Feldstudie

Betrieb	OD% - Werte*						
	n	2016	n	2017	n	2018	F-Test [p]
<b>Σ 1-10</b>	<b>821</b>	<b>23,4±29,2<sup>a</sup></b>	<b>1007</b>	<b>20,8±25,1<sup>b</sup></b>	<b>942</b>	<b>17,5±19,3<sup>c</sup></b>	<b>&lt;.0001</b>
1	85	25,8±30,4 <sup>a</sup>	73	15,7±10,8 <sup>b</sup>	65	19,2±20,7 <sup>ab</sup>	0,0182
2	80	21,1±21,2 <sup>a</sup>	94	21,2±24,8 <sup>a</sup>	63	28,0±26,8 <sup>a</sup>	0,1602
3	57	10,4±13,6 <sup>b</sup>	91	19,3±17,8 <sup>a</sup>	92	17,8±13,8 <sup>a</sup>	0,0022
4	72	10,2±13,8 <sup>b</sup>	70	24,9±23,8 <sup>a</sup>	78	9,91±8,03 <sup>b</sup>	<.0001
5	77	10,7±12,9 <sup>b</sup>	82	25,0±25,0 <sup>a</sup>	46	16,5±11,2 <sup>b</sup>	<.0001
6	117	35,5±35,5 <sup>a</sup>	103	18,9±23,0 <sup>b</sup>	205	19,3±20,2 <sup>b</sup>	<.0001
7	105	36,1±36,2 <sup>a</sup>	82	13,3±13,9 <sup>b</sup>	187	17,7±19,9 <sup>b</sup>	<.0001
8	72	26,4±33,6 <sup>a</sup>	167	29,9±34,6 <sup>a</sup>	70	19,0±23,4 <sup>a</sup>	0,0591
9	106	27,0±29,5 <sup>a</sup>	166	22,1±29,1 <sup>ab</sup>	72	16,7±18,2 <sup>b</sup>	0,0464
10	50	9,51±16,6 <sup>a</sup>	79	7,58±7,97 <sup>a</sup>	64	7,47±13,6 <sup>a</sup>	0,6320

\*Auswertung mittels Multipler Spannweitentest nach Ryan-Einot-Gabriel-Welsch mit versuchsbezogener Irrtumswahrscheinlichkeit

Die im Rahmen der Studie ermittelten serologischen Kennzahlen wiesen bei einer **Auswertung über alle Betriebe** eine signifikante Reduktion in den mittleren OD%-Werten über den o.g. Zeitraum auf. Bei



# Salmonella status of all farms within the testing period until 30/6/2018 (n=67.119):



	Quarters						
Salmonella status	IV 2016	I 2017	II 2017	III 2017	IV 2017	I 2018	II 2018
Category I	10	11	12	15	14	12	13
Category II	6	6	6	3	2	1	0
Category III	0	1	0	0	0	0	0



# Overview about boar taint deviators, n=46.061



8 out of 9 farms are without stinkers since 1 year

<b>II 2017</b>	887	1.464	700	804	960	699	225	1.638	1.968	<b>9.345</b>
<b>Boar taint deviator 2. Quarter</b>	228	25	54	0	155	0	0	123	0	<b>585</b>
<b>III 2017</b>	893	1.466	700	800	960	700	220	1.650	1.900	<b>9.289</b>
<b>Boar taint deviator 3. Quartal</b>	0	0	0	0	0	0	5	0	0	<b>5</b>
<b>IV 2017</b>	893	1.466	700	800	960	700	220	1.650	1.900	<b>9.289</b>
<b>Boar taint deviator 4. Quartal</b>	0	0	0	0	0	0	93	0	0	<b>93</b>
<b>I 2018</b>	893	1.466	700	800	960	700		1.650	1.900	<b>9.069</b>
<b>Boar taint deviator 1. Quartal</b>	0	0	0	0	0	0		0	0	<b>0</b>
<b>II 2018</b>	893	1.466	700	800	960	700		1.650	1.900	<b>9.069</b>
<b>Boar taint deviator 2. Quartal</b>	0	0	0	0	0	0		0	0	<b>0</b>

- Evaluation until quarter II 2018: 14 farms with 12,761 fattening places are in total 67,119 pigs.
- Results by individual housing conditions and given feed concept:
  - Salmonella reduction (-35% resp. -30%)
  - Reduction or avoidance of boar taint deviators
  - At the same time good performance (notable > 800g daily increase in weight), on some farms 1,000g daily increase in weight
- The field study will be finished in summer 2019 to gather further data and farms and to exclude seasonal effects.

## The 6-R research project for rye feeding

Gefördert durch:



Bundesministerium  
für Ernährung  
und Landwirtschaft

ptble

Projekträger Bundesanstalt  
für Landwirtschaft und Ernährung

aufgrund eines Beschlusses  
des Deutschen Bundestages





Die Verbundpartner des Projektes "6-R-Konzept" auf der Pressekonferenz in Berlin.  
Quelle: Deutscher Raiffeisenverband

## Die Renaissance des Roggens in der Tierernährung

Um einen Beitrag zur Erreichung der Weltklimaziele des Pariser Klimaschutzabkommens zu leisten, fördert das Bundesministerium für Ernährung und Landwirtschaft (BMEL) im Innovationsprogramm das Forschungsprojekt "6-R-Konzept". Mit dem Vorhaben soll eine verstärkte Nutzung von Roggen in Mischfutterkonzepten für Schweine zur Förderung des Umwelt-, Tier- und Verbraucherschutzes untersucht werden.

Die BLE betreut das Projekt mit dem Titel "Regionale Renaissance von Roggen und Raps zur Reduktion von Problemen in Pflanzenbau und Tierproduktion durch Reevaluation der Inhaltsstoffe und deren gezielte Nutzung zur Förderung des Umwelt-, Tier- und Verbraucherschutzes" als Projektträger (ptble).

Am 18. Juli 2018 ist das Projekt mit einer Pressekonferenz beim Deutschen Raiffeisenverband in Berlin gestartet. Ziel des dreijährigen Projektes "6-R-Konzept" ist, die spezifischen Inhaltsstoffe von Roggen zu

# Contents of the 6-R-Concept



## ■ Project points:

### University Hannover

- Analysis of feed value
- Determination of prc digestibility
- In-vitro Fermentation trials
- Infection trials (Salmonella / E.coli)
- Effects of the behavior of gestation sows

### University Bonn

- Characterisation of fiber fraction in feed
- Digesta- & fecal samples
- Substrate before / after fermentation
- Determination of ME
- Determination of P-digestibility  
(with/without Phytase supplementation) from rye

### University Berlin

- Impact of the 6-R-Concept of
- Gut health (gut cell wall, inflammatory reaction)
- Composition of gastrointestinal microbiota
- Immuno system

### KWS LOCHOW GMBH

- Cultivation of hybrid rye (field trial)
- Analysis of feed value (Ingredients)
- Feed safety (mycotoxine)
- Evaluation of data from fattening trials (field trial and research trial)
- Anaylsis of economical value of rye as plant and feed component

# These are possible answers



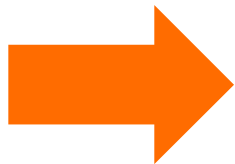
Dominant questions for foods as well as tasks for politics and agricultural research after the second world war in Europe (Flachowsky, 2003)

## Questions/tasks

Consumer	I am hungry	I have an appetite	I am worried
	Is there anything to eat?	What is there to eat?	How safe is the food?
Politics	<b>Food security</b>	<b>Food quality</b>	<b>Food safety</b>
	granting sufficient food	reduce of surplusses	
Agricultural science	Agricultural production	Quality research	Safety research
	increase	product quality	
	Use of all ressources	Process quality	
	to go easy on resources		
	1945 ↑ 1950	1960	1970
		1980	1990
			2000
	FAL Founding		

## The feeding concept with rye creates:

- Improved food safety
- Improved animal health
- More quiet animals and more animal welfare
- Significantly reduced boar taint
- Comparable fattening performance
- A strongly NP-reduced feeding concept
- Hihgest agricultural water efficiency
- Lowest plant protection efforts of all cereals



- Ban of active ingredient
- Fertilizer regulation
- Animal welfare
- Water protection
- Emissions protection
- Bees protection
- ...

Shortly at the food retailing...



Do not save money at the hair-dresser.



**AND** do not save money on well produced food.



Times are changing...



In the past, parents had about four children.  
Today, children have about four parents.

Gefördert durch:



aufgrund eines Beschlusses  
des Deutschen Bundestages

# Thank you very much for your attention!

PollenPlus® hybrid rye raises animal welfare.



SEEDING  
THE FUTURE  
SINCE 1856

