Future Expectations of Producers and Consumers from Poultry Genetics

By: Prof. Dr. Rudolf Preisinger

69th EAAP Annual Meeting, Dubrovnik, August 2018

What are the challenges for our industry?

Worldwide:

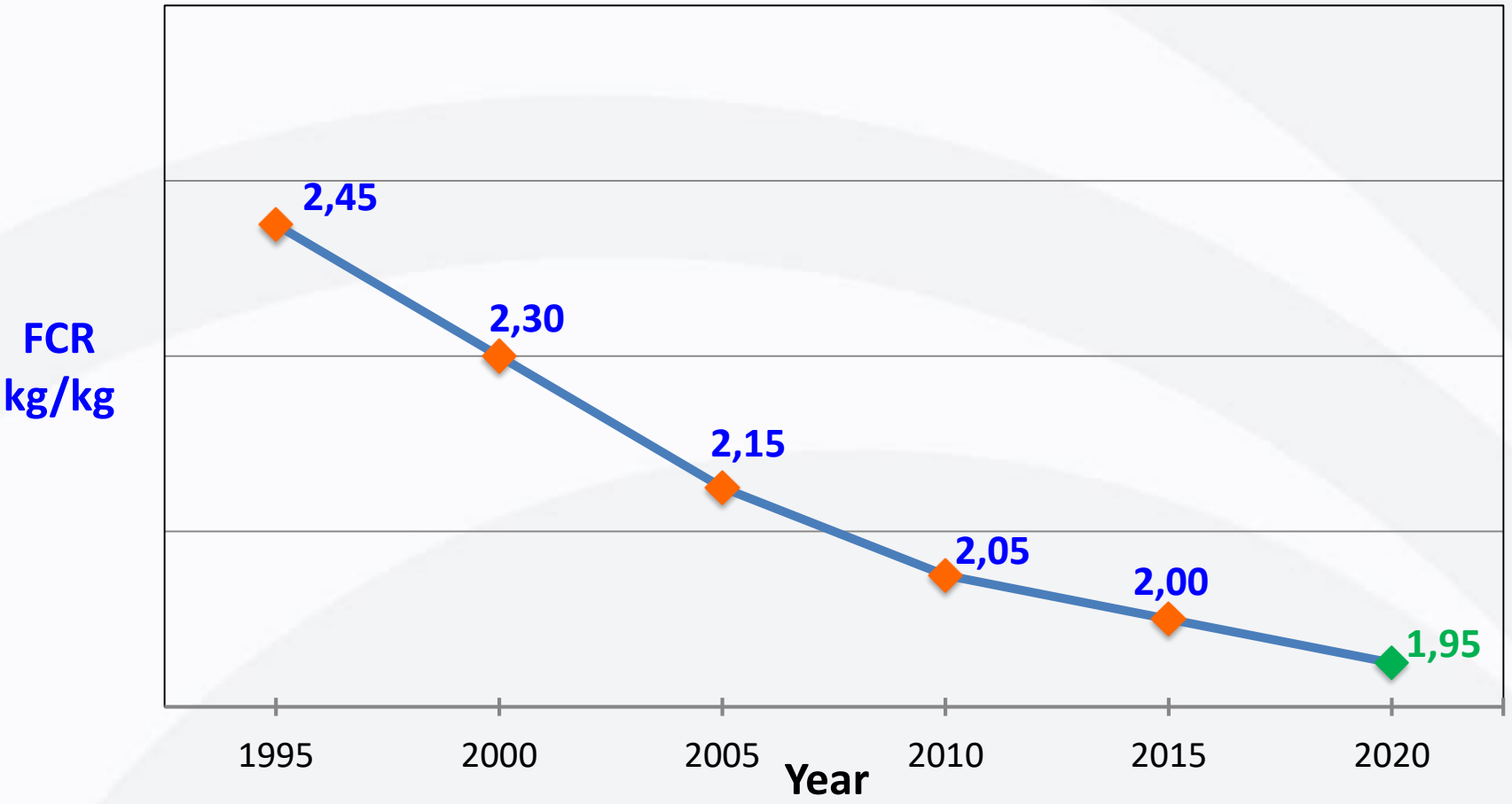
- Constantly high feed prices
- Animal welfare is gaining more importance
- Stronger shells for longer cycles without molting (lifetime performance)

Europe:

- Better bones
- Ban of mutilations (beak treatment)
- Culling of day-old male chicks
- Less protein from overseas

EW GROUP

Sustainability and Efficiency
“a global perspective“



0.50 kg lesser feed per kg egg mass in 25 years

EW GROUP

Savings in the last 20 years

Region	Humans (mil.)	Layers (mil.)	Feed 1000 T	Hectares of wheat
Germany	81	48	388	55,543
Europe	508	380	3,078	439,714
USA	321	300	2,430	347,143
India	1311	195	1,579	225,643
World	**7349**	**7035**	**56,983**	**8,140,500**

A saving of 8 million hectares in 20 years!!

EW GROUP

Conventional Cages versus New Systems

Change in housing systems:

- Ban of conventional cages in the EU since 2012
- Changing expectation of consumers/retailers response
- EU and North America

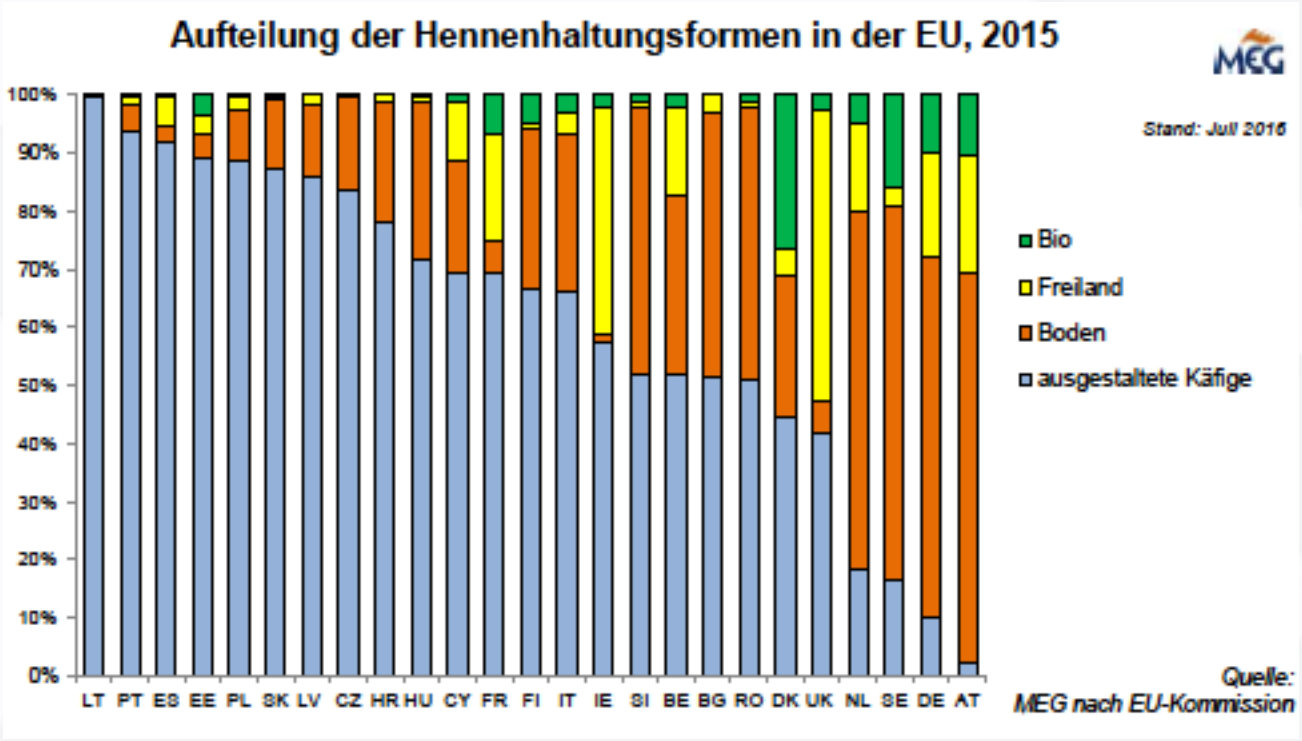
  (The U.S. alone has to convert **190 million** hens!!)

Disadvantages for producers:

- 14 to 28% higher production cost (space, feed intake, mortality, downgraded eggs)

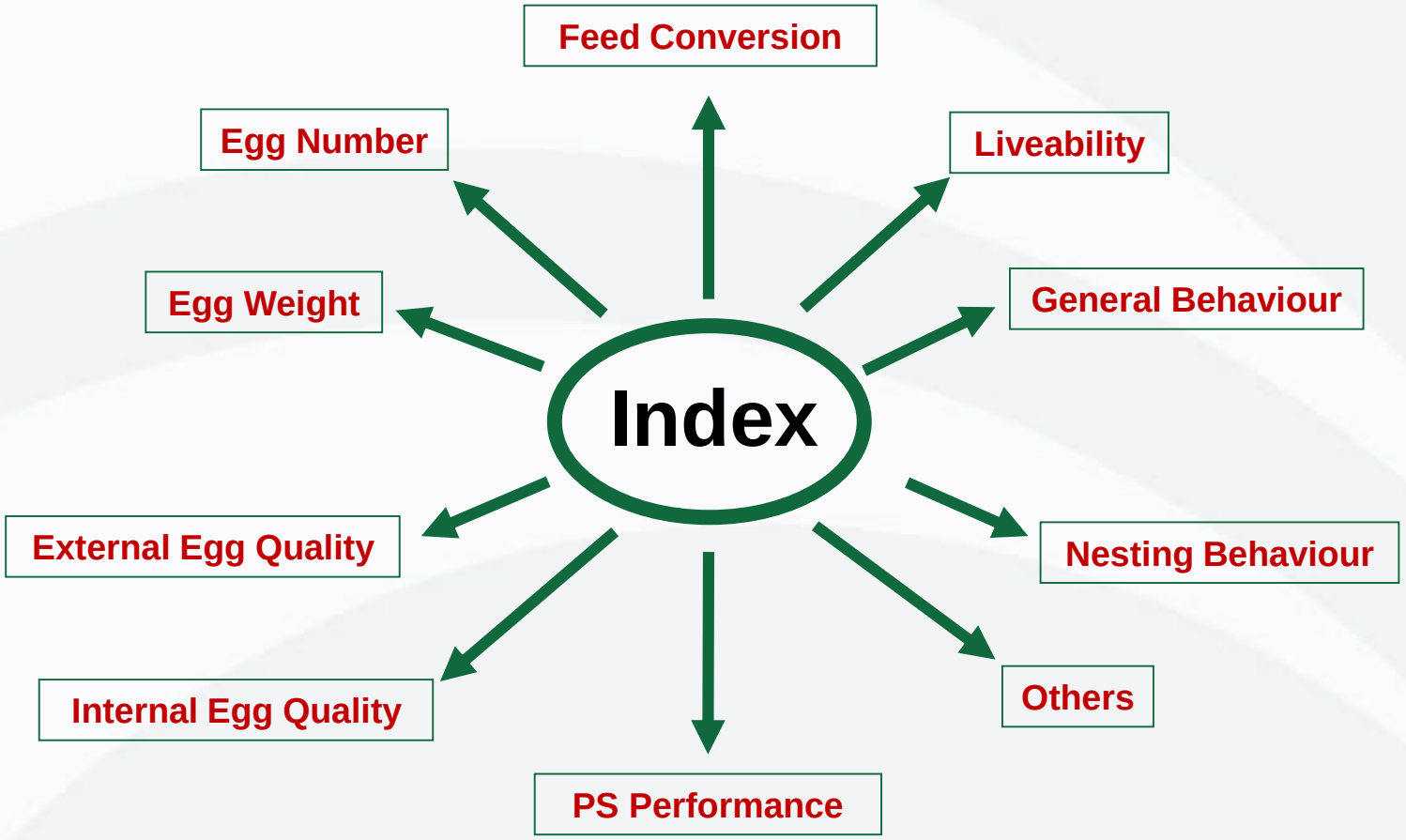
EW GROUP

Breakdown of housing systems within the EU

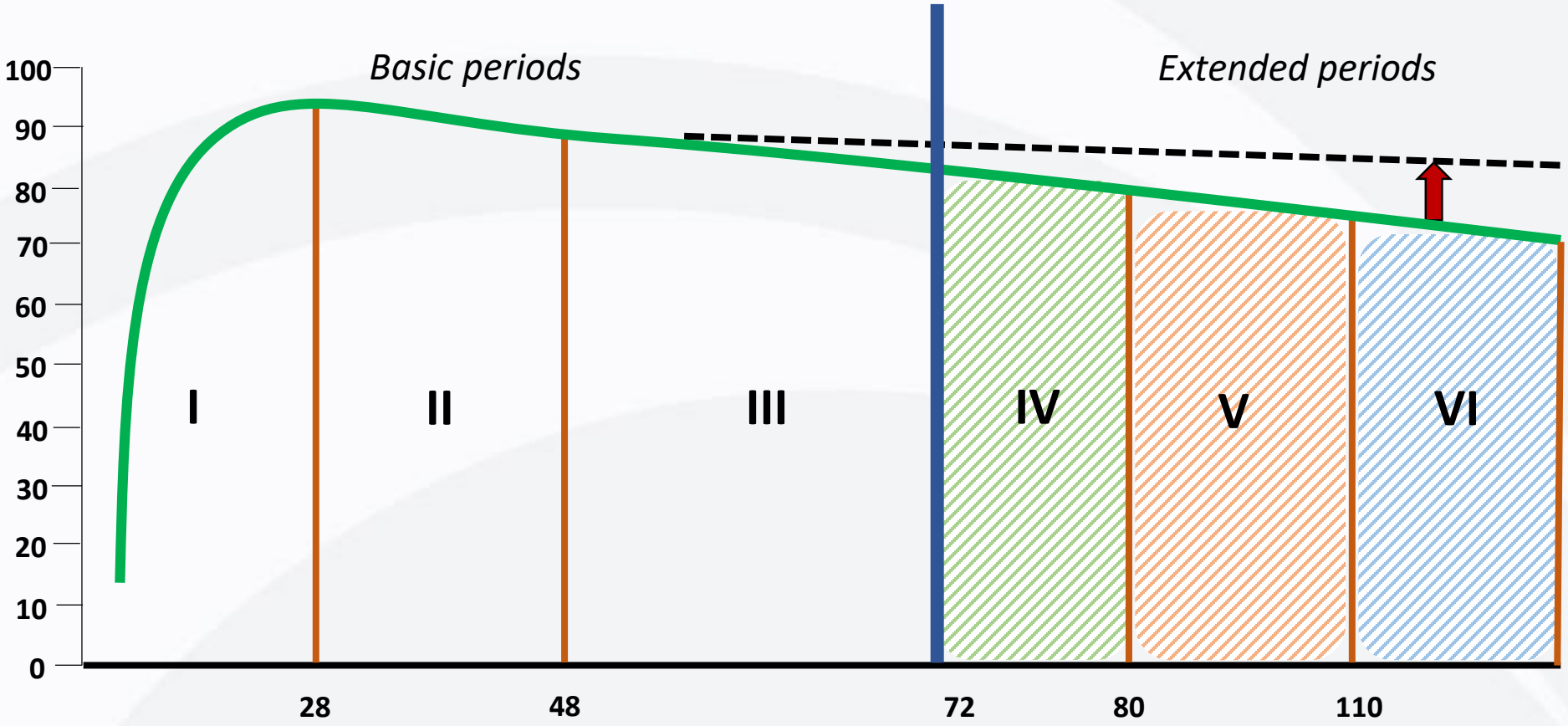


Organic Free-range Floor Enriched cages

Balanced Breeding / Dynamic Process



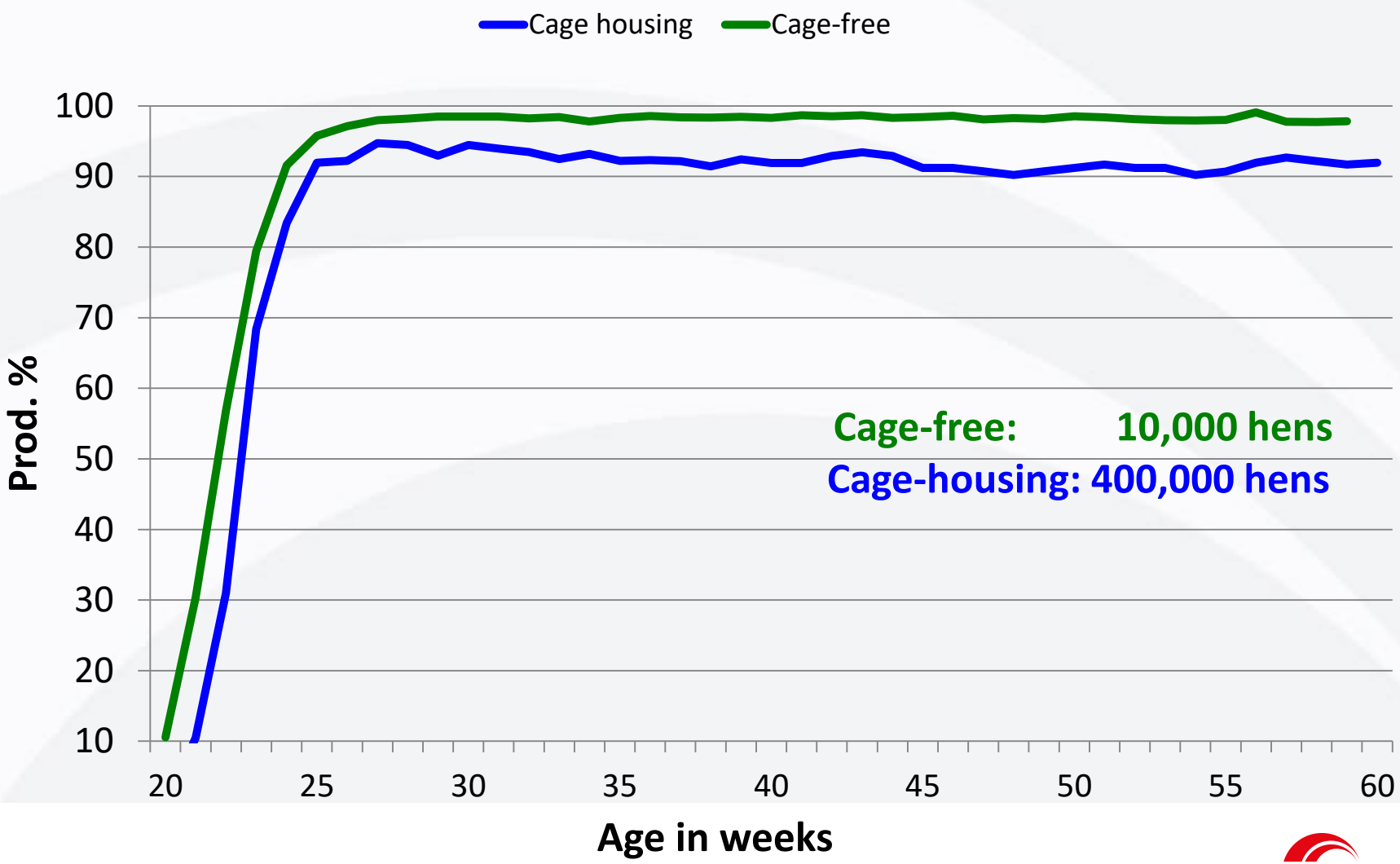
Breeding for longer laying cycles



Each segment represents an individual trait, multi trait genome wide selection

EW GROUP

Laying performances of LSL-Lite in the U.S.



EW GROUP

LOHMANN LSL – Persistency in lay

Data:

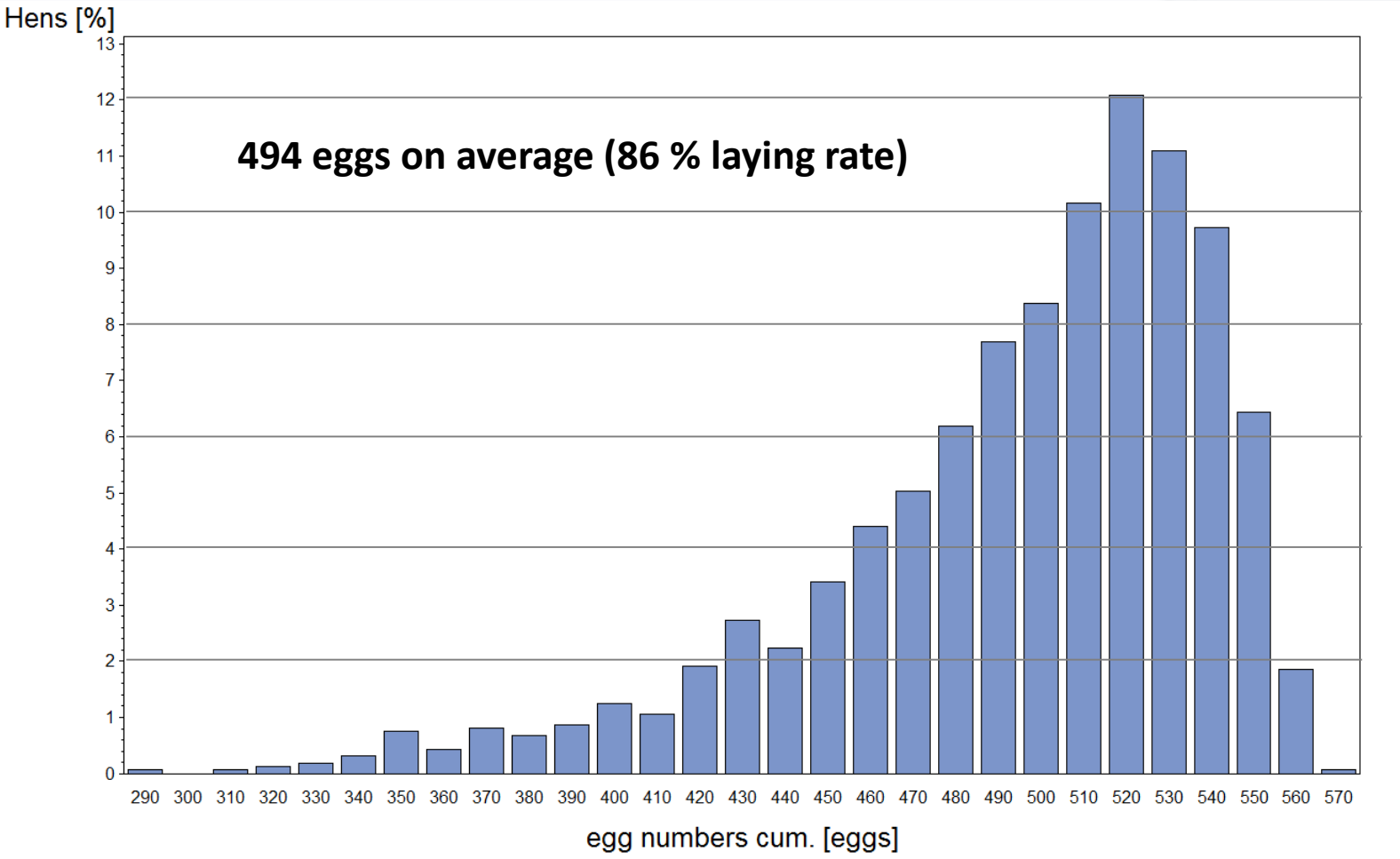
- 1613 individually tested layers (one house)
- 21 to 102 weeks of age
  - 82 production weeks
  - 574 production days

Results:

- 500 eggs reached by 56 % of the hens
  - 500 eggs in 515 to 574 days
  - With an average laying performance of 91.6 % (526 eggs)
  - Maximum clutch size of 400 eggs

EW GROUP

Distribution of the cumulative egg numbers in 574 production days



EW GROUP

Egg numbers presented in laying sequences, or respectively, clutch sizes

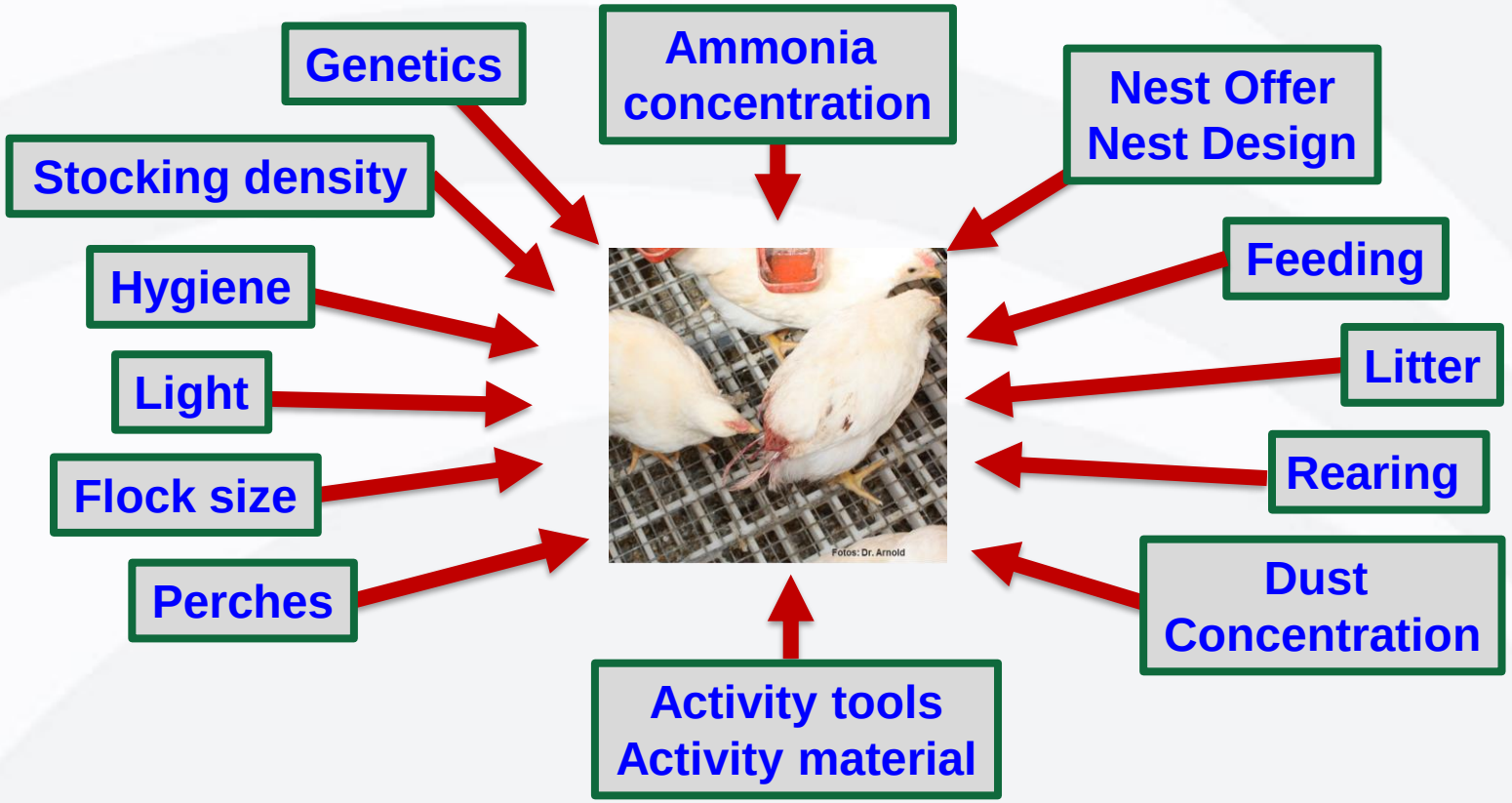
i.e. 500 eggs in 515 days ⇔ 97 % egg production

+ 3 eggs in the 1st clutch	➡	2 days off
+ 25 eggs in the 2nd clutch	➡	1 day off
+ 16 eggs in the 3rd clutch	➡	1 day off
+ 180 eggs in the 4th clutch	➡	1 day off
+ 68 eggs in the 5th clutch	➡	3 days off
+ 108 eggs in the 6th clutch	➡	1 day off
+ 31 eggs in the 7th clutch	➡	2 days off
+ 17 eggs in the 8th clutch	➡	1 day off
+ 19 eggs in the 9th clutch	➡	2 days off
+ 22 eggs in the 10th clutch	➡	1 day off
+ 11 eggs in the 11th clutch		

500 eggs in 515 days

EW GROUP

Which factors can cause feather-pecking and cannibalism?



Consequences of foregoing Beak Trimming

Higher feed consumption due to:

- A higher activity of the birds
- More spillage of feed
- Feather damage
- Increased mortality

An average of
5 g more feed/hen/day
is realistic

EW GROUP

Beak length - new phenotype

- Shape of the beak and feather cover
- Shape of the beak and livability

EW GROUP

Heritability for beak length in white egg and brown egg pure lines

Line	White egg	Brown egg
A	.21	.21
B	.24	.25
C	.09	.13
D	.12	.16

Consistent genetic variation in all lines

EW GROUP

Ultrasound examination for Better Bones

Stronger shells and better bones

Ultrasound examination for Better Bones

Stronger shells and better bones

Heritability for Keel Bone examination and ultrasound examination of the humerus in white leghorn pure lines

Trait	Male line	Female line
Keel bone assessment *	.30	.15
Ultrasound examination	.20	.17

** Subjective human scoring of keel bone deformation (scale 1 – 3).*

EW GROUP

Recording programme in North America

Test environments

- Conventional single bird cages
- Conventional battery cages

Programme in Europe

Varying test environments

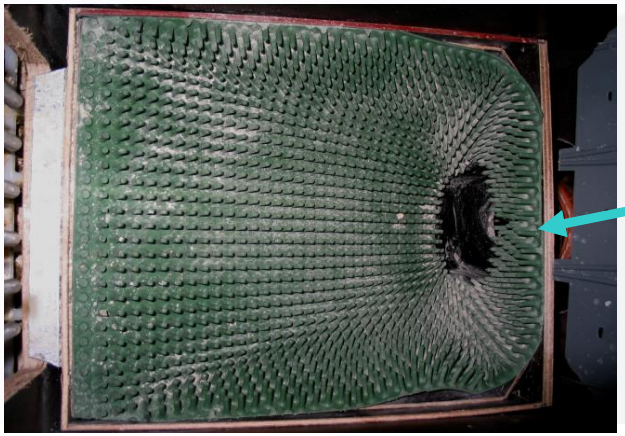
- Enriched single bird cages
- Colony cages/small aviaries
- Floor housing/Funnel Nest Box

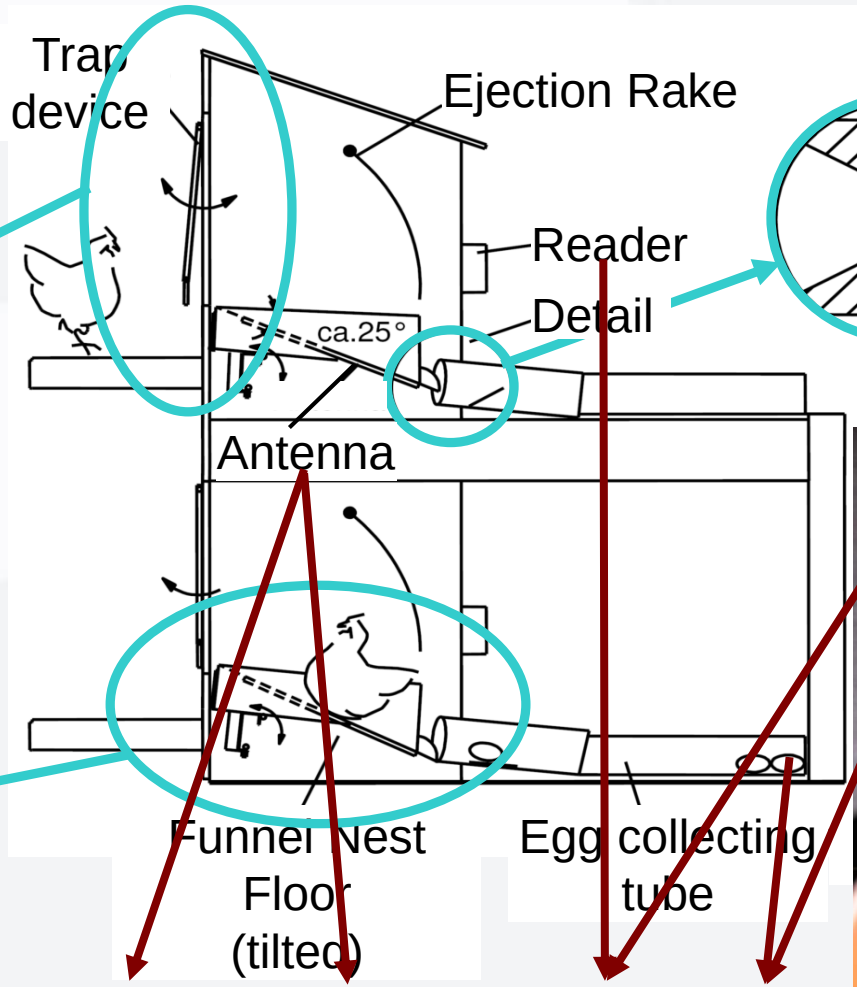
Key trait:
Number of saleable nest eggs (penalising families with poor nest acceptance)

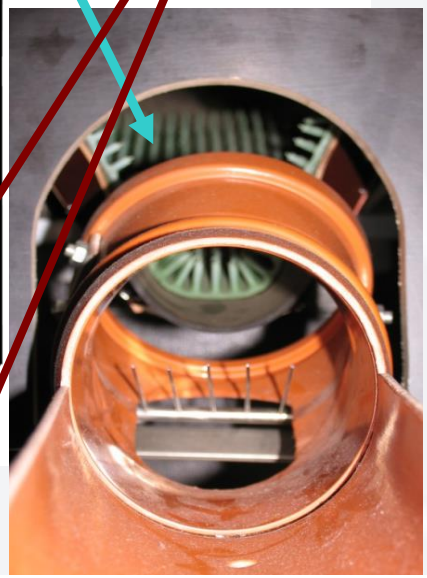
“Vital and docile layers with stable plumage, strong bones and performance-based feed consumption, laying an egg with a robust shell in the nest, EVERY DAY!”

EW GROUP

Hen-specific performance testing in floor housing – Funnel Nest Box with transponders







Nest + Hen + time + egg

EW GROUP

Selection goals

Selection must not be focused on current market / customer needs alone

but rather ...

On global market needs of the future,

in terms of;

- ✓ Longer cycles
- ✓ Feed / number of saleable eggs
- ✓ Bird welfare and egg quality
- ✓ Feather cover

EW GROUP

Total breeding value ►balanced selection

- Combines **Production**, **Quality** and **Livability** traits
- Genomic selection has enhanced genetic progress in all traits (more accurate, faster)
- Each breeding company sets its own priorities
- Each commercial product has its own

  individual genetic make-up

- Pure line response determines the rate of progress and finally, the genetic characteristics of each bird

→ The best priorities in selection would be inefficient if pure lines do not respond accordingly (lack of selection response)

EW GROUP

Genotype/Management

- Increasing performance level and the importance of behaviour characteristics demand performance-related nutrient supply
- Diets have to be formulated according to egg mass output which is only partially reflected in rate of lay

  (rate of lay) x (egg size) = egg mass/day
- Cage-free environments give less options for management/nutritional adjustments (a disadvantage for Europe)

EW GROUP

Challenge

- If nutrient supply does not cover the daily needs, feather cover will suffer and mortality will increase, and shell quality will deteriorate faster (shorter cycles).

Open question:

Can genetics cover mistakes in nutrition and management?

More robust chicken will perform less under good conditions as compared to chickens selected for maximum efficiency.

Answer:

Selection for a balanced profile with good efficiency and perfect behaviour characteristics, has to be supported by good management.

EW GROUP

The future of egg production

Genomic selection has proven its advantage when combined with reliable phenotypic measurements.

"In the coming years, the prosperity of the egg industry will be driven by genetic progress and adjusted husbandry systems."

"Animal welfare will play a major role."

(Liveability, feather cover, bone strength)

"Less focus on more eggs/hen housed."

EW GROUP

Thank you for your attention.

Do you have any questions?

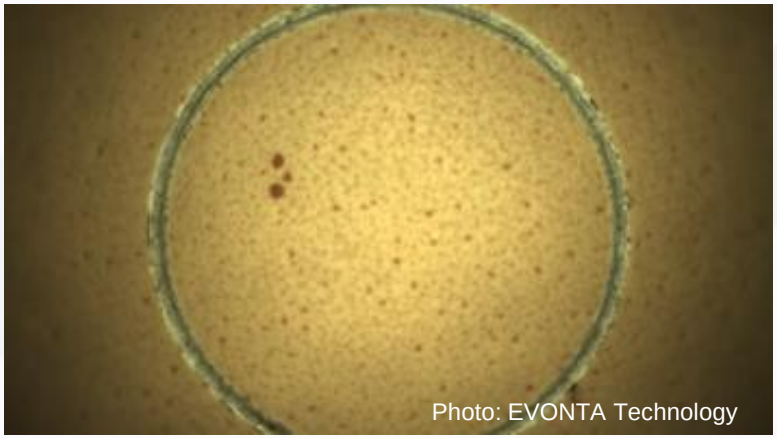
In-ovo gender determination (Claims)

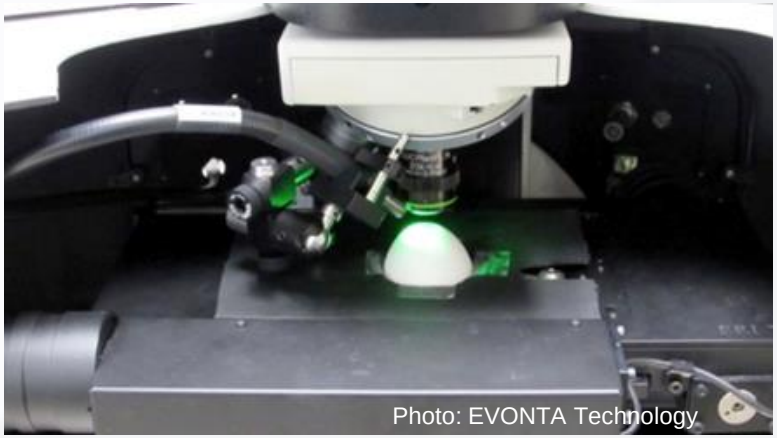
- Canada: Non-incubated, 98%
- U.S.A.: Sex reversal with LED light
- Holland: Day 9, metabolites from allantoic fluid, 95%
- Germany: Day 9, hormones from allantoic fluid, 98%
  2 hours for the test results (published in 2013)
- Germany: Day 4,
  infrared spectroscopy (optical),
  fast, accurate (95+%)

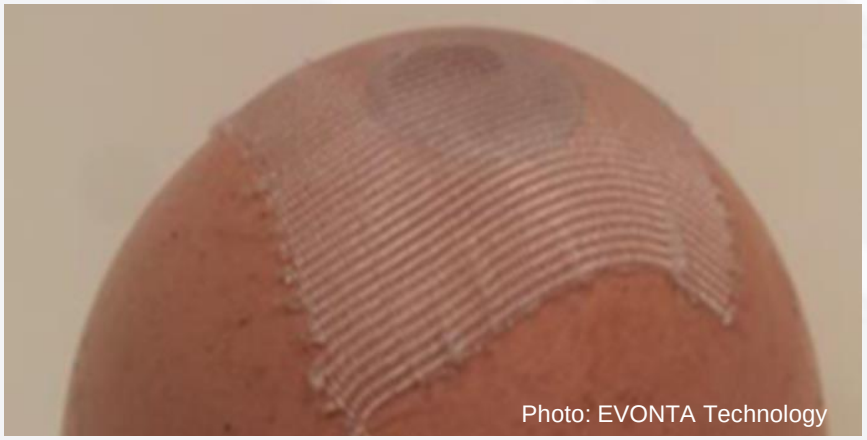
Problem: 12mm hole in the shell.
When will automation actually be available??

EW GROUP

How does it work?







EW GROUP

EW GROUP GmbH
Hogenbögen 1 . 49429 Visbek . Telefon +49 4445 950 59 700 . Fax +49 4445 950 59 750
holding@ew-group.de