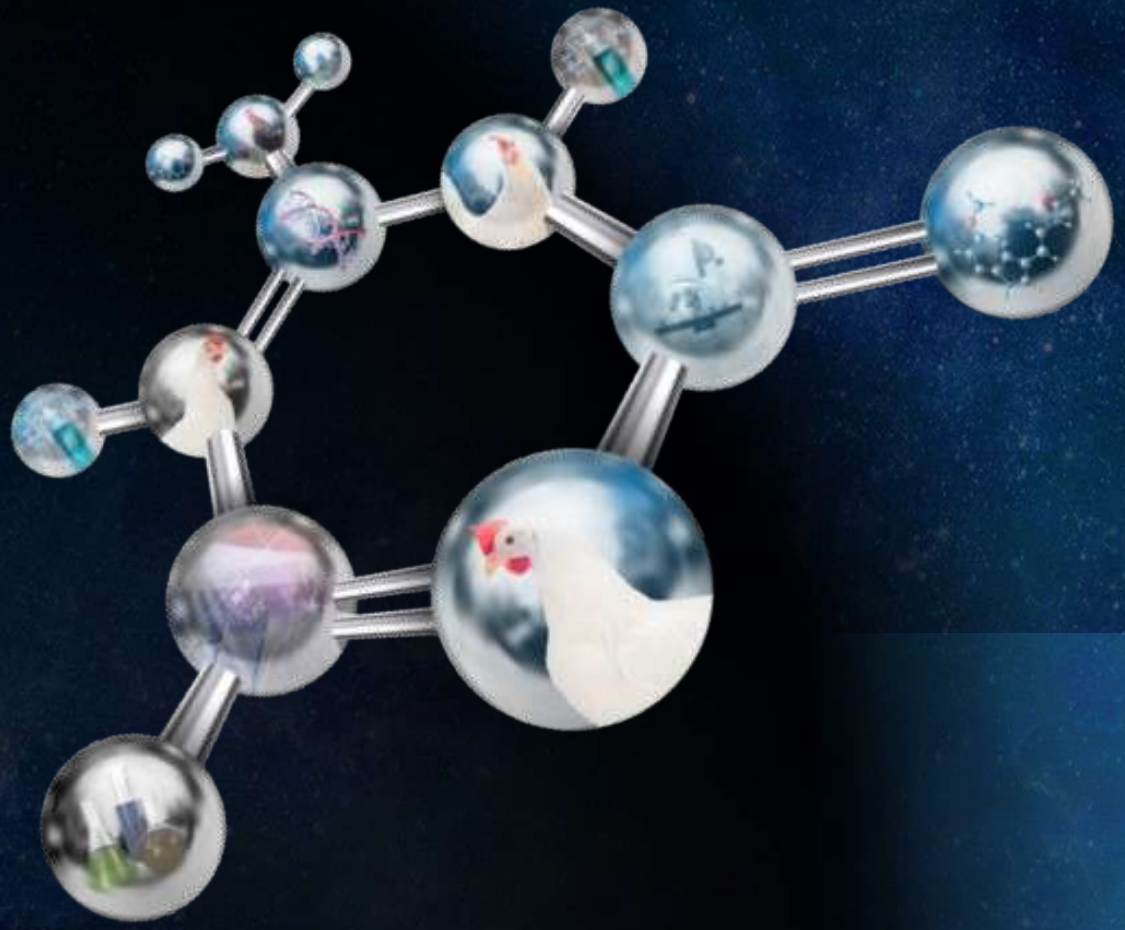


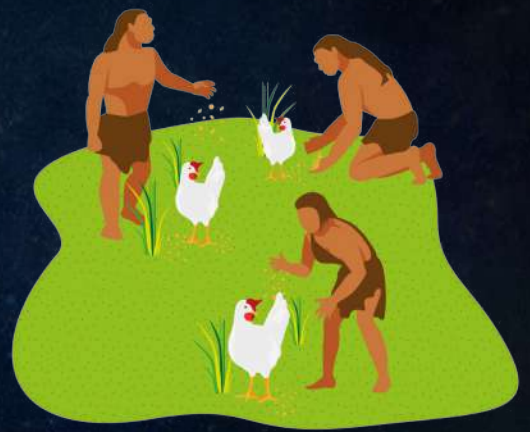
Future of the layers

Dr. David Cavero Pintado

H&N Layer Academy - Cuxhaven, 14.11.2023

Evolution of the laying breeding sector

Past



1930

1980

2010

2020

(Arthur & Albers, 2003; Cavero & Flock, 2021; Crawford, 1990 ; Hartmann, 2000; Hunton, 1990; Preisinger, 2021; Wolc et al., 2014; …)

Data Recording

Breeding Farms

Single Cages	Group Cages	Floor System
		

Breeding Farm – Pure Lines

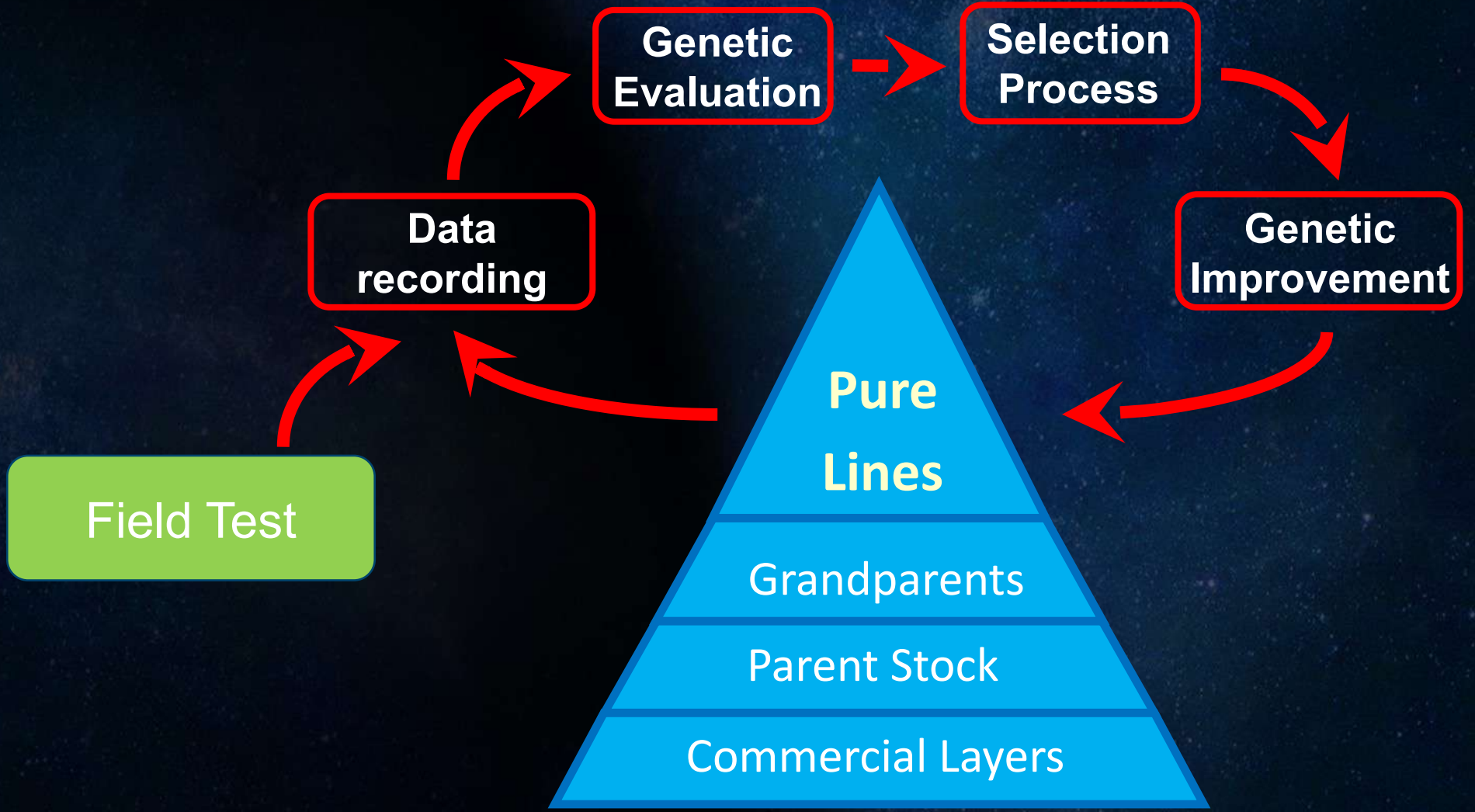
Data Recording

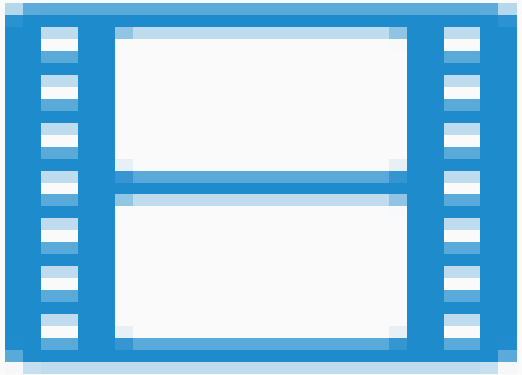
Field Testing – Commercial Farms

Group Cages

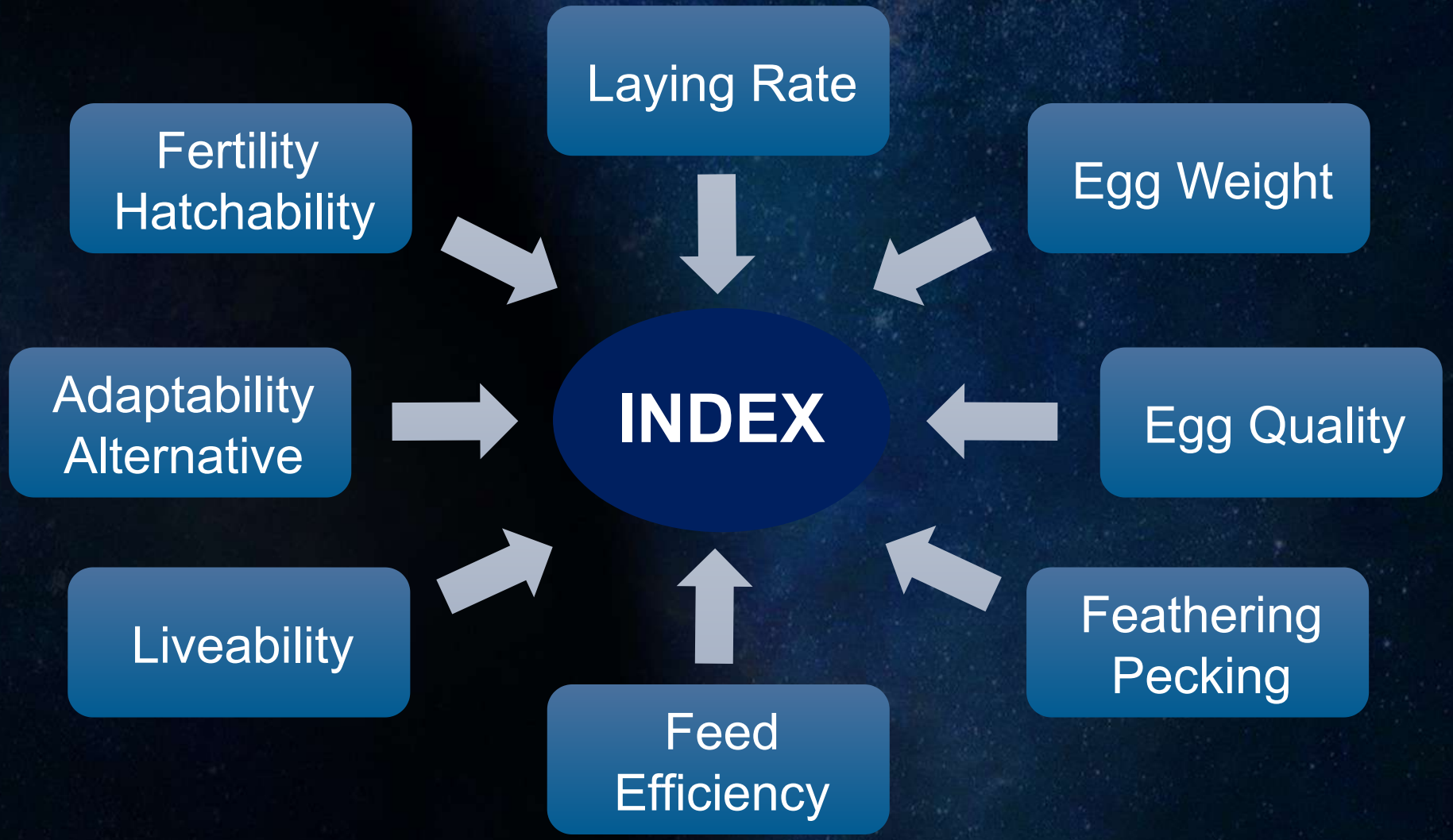
Free Range

Structure of the Laying Breeding

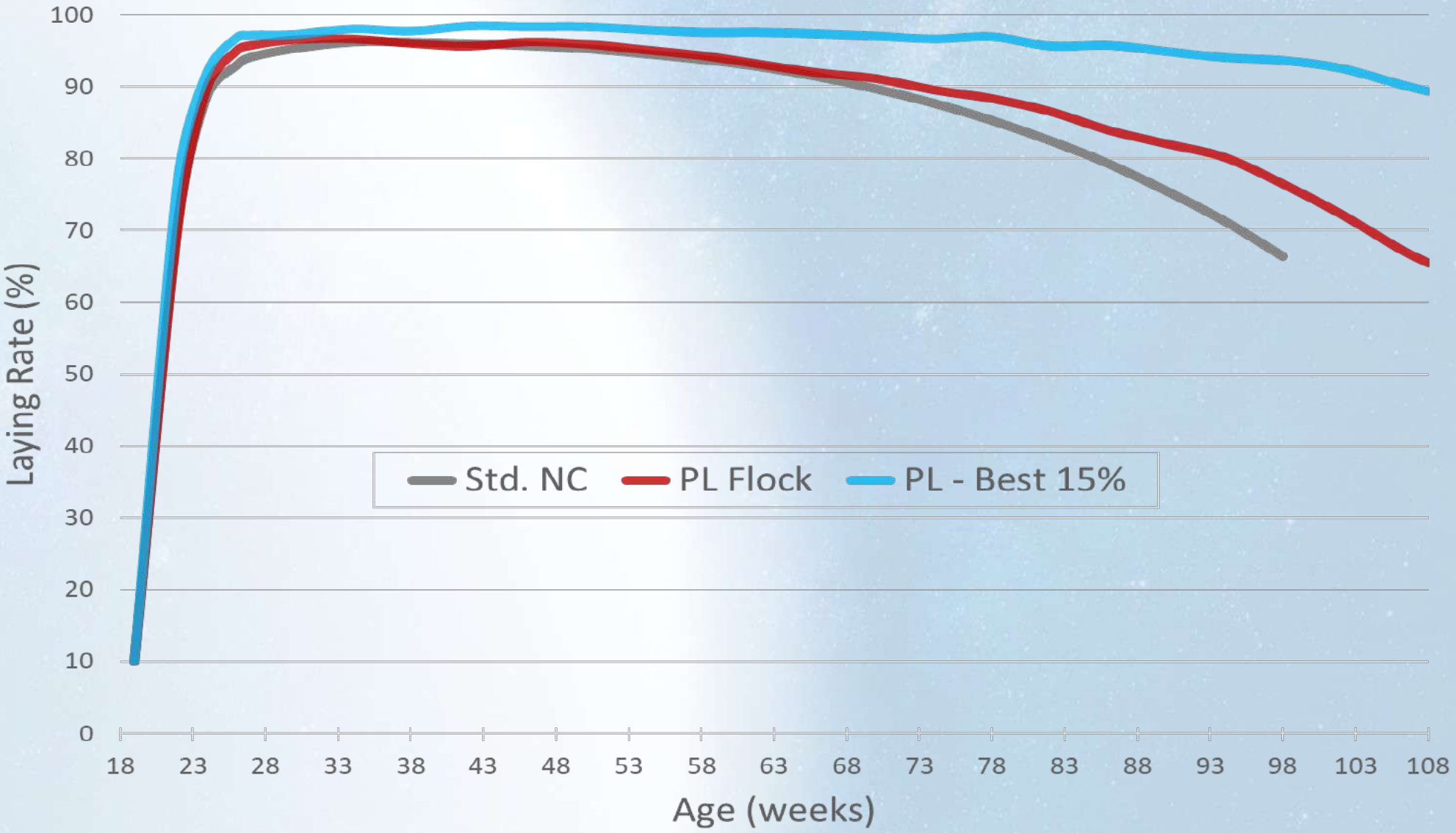




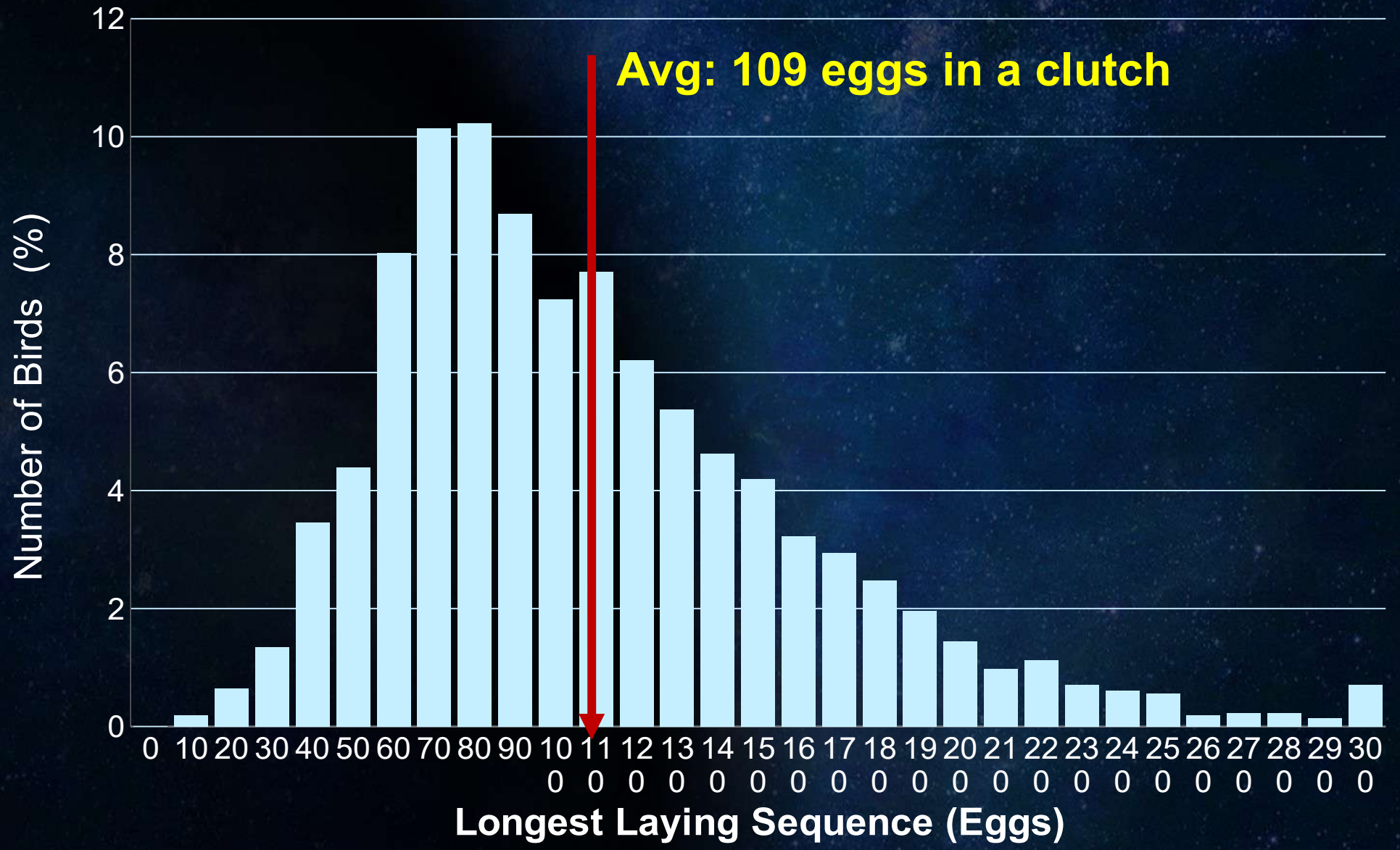
Balanced Selection



Laying Performance - Persistency

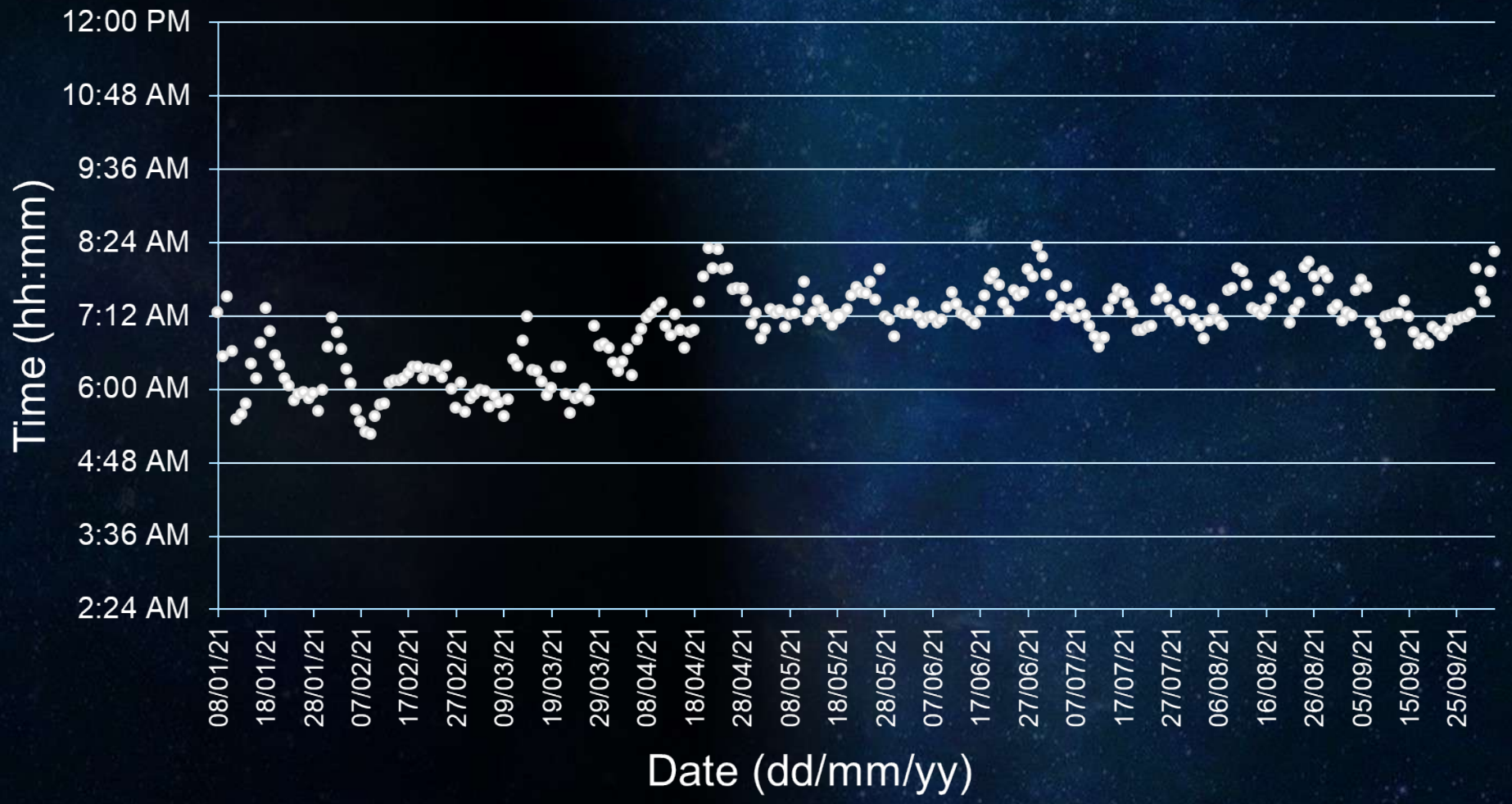


Clutch length



Laying time

White egg hen – 269 Eggs in 269 production days (100%)



Evolution of Egg Numbers

Cage Management Guides - 80w

2019 376 - 100w (473)

2015 373 - 95w (445)

2011 371 – 90w (421)

2006 363 – 80w

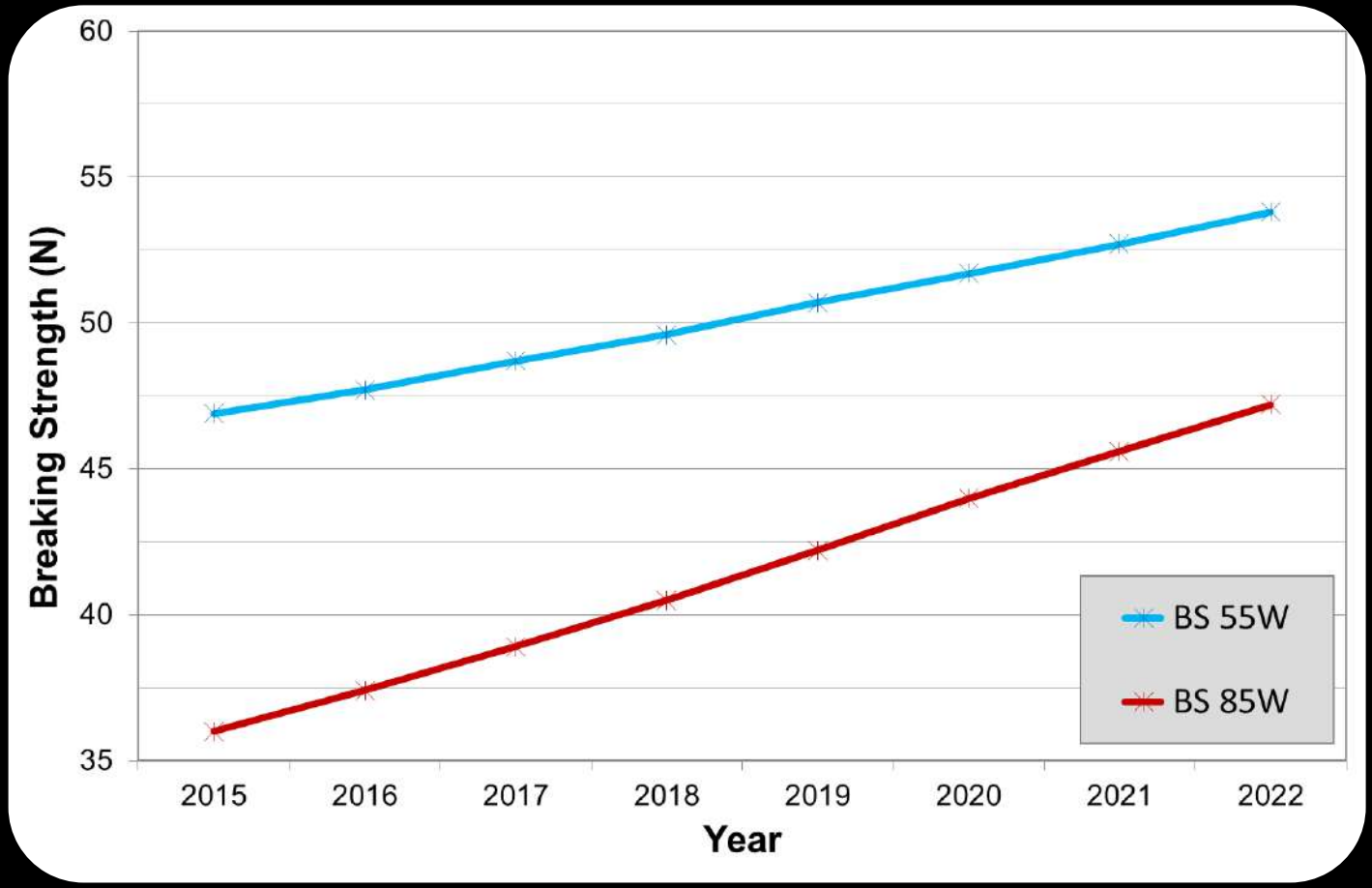
Eggshell Strength

Eggs breaks at the right time!

Selecting for a better eggshell:

- ✓ Reduce waste
- ✓ Decrease contamination risk
- ✓ Extend flock production life

Breaking Strength



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Eggshell Quality

Genetic Trend at 90w

+0.8 N per year

Breaking Strength (N)

50	Excellent
45	Very Good
40	Good
35	Regular
30	Bad
25	Very Bad

Egg Weight

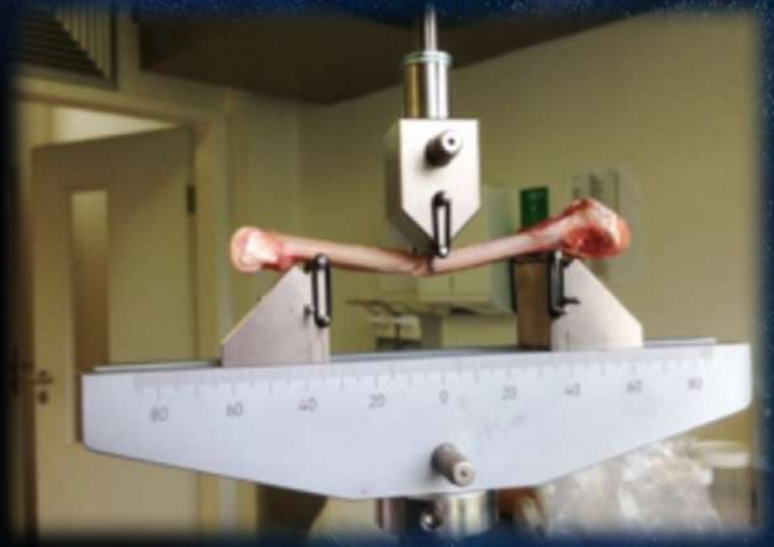
Influencing Factors:

- Light stimulation, Body Weight, Feed
- Genetic – h^2 ~ 0.6

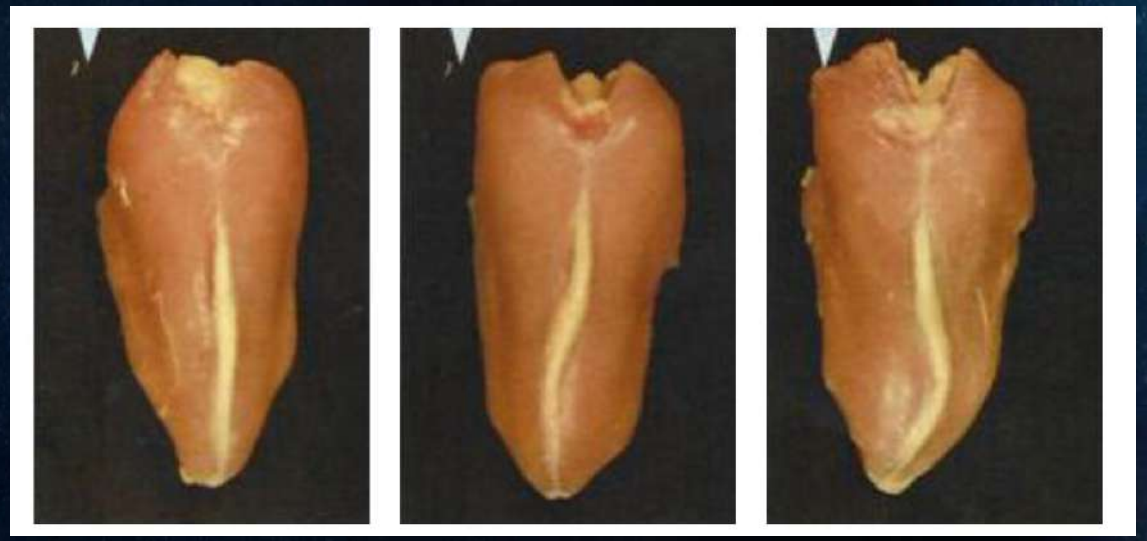
Goals:

- Max. N. eggs in desired class
- Fast EW increase at the beginning
- Flat EW curve after 60 weeks

Improve Bone Stability



Improve Bone Stability

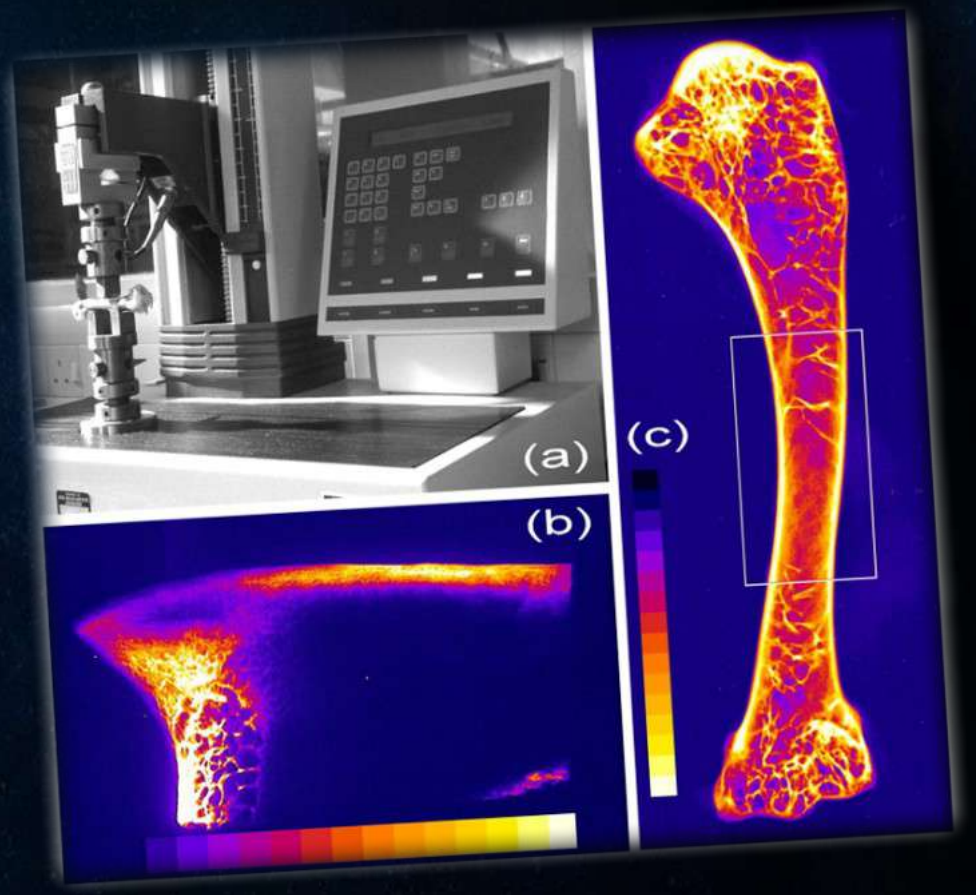


Palpation

X-Ray Analysis (Tibiotarsus)

Bone Quality

Post-mortem Bone Quality



- ✓ Keel bone is hard to measure and h^2=0.03
- ✓ Humerus & Tibia quality traits: h^2 ~ 0.2-0.6
- ✓ No neg. correlation with persistency (r_g=+0.25)
- ✓ No link to BS (r_g=±0.1)
- ✓ Neg. correlation with early maturity (r_g=-0.73)
- ✓ Well-mineralised medullary bone is important for skeleton quality

(Source: Dunn et al., 2021, Anderson et al., 2023)

Rearing: An investment for the future

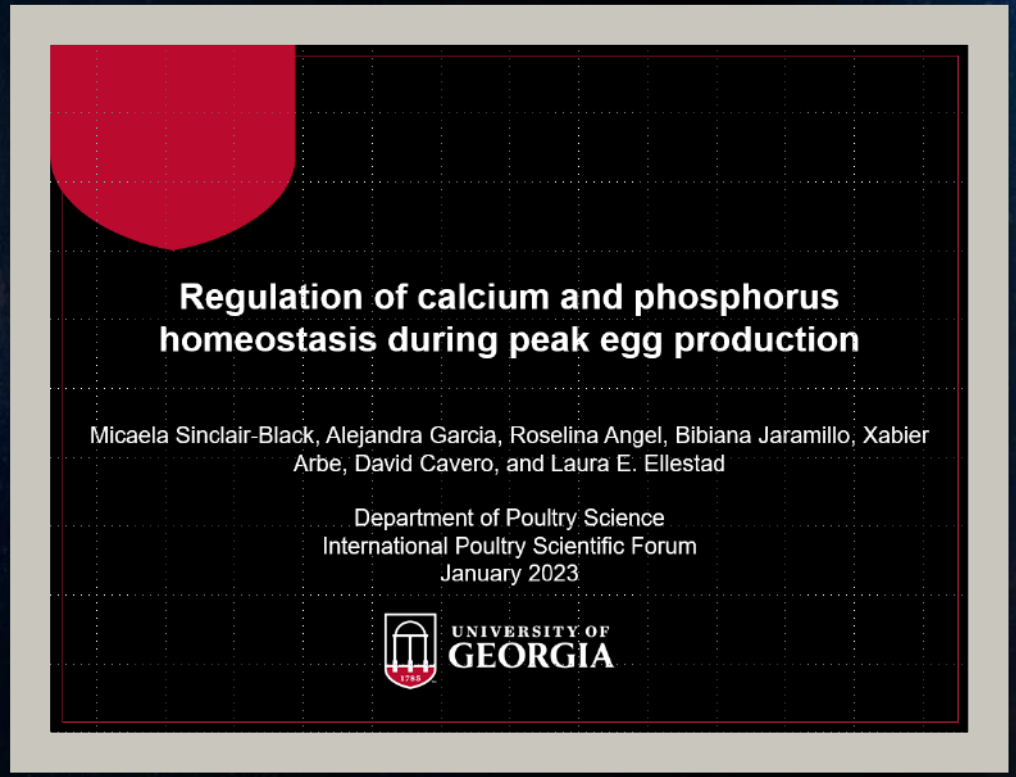
Not only Costs! - BW & Uniformity: The key for success!

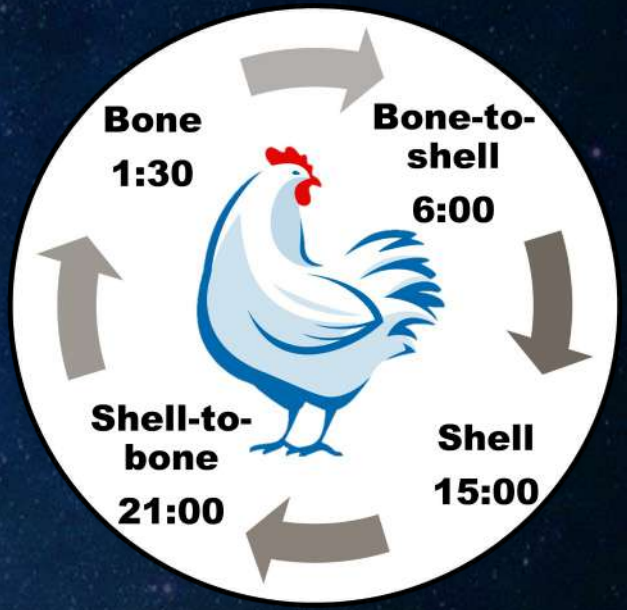
Good Immune System

Feed Intake Capacity

Ca-P Metabolism in hens

Ph.D. supervised by Prof. Laura Ellestad (started 2020)







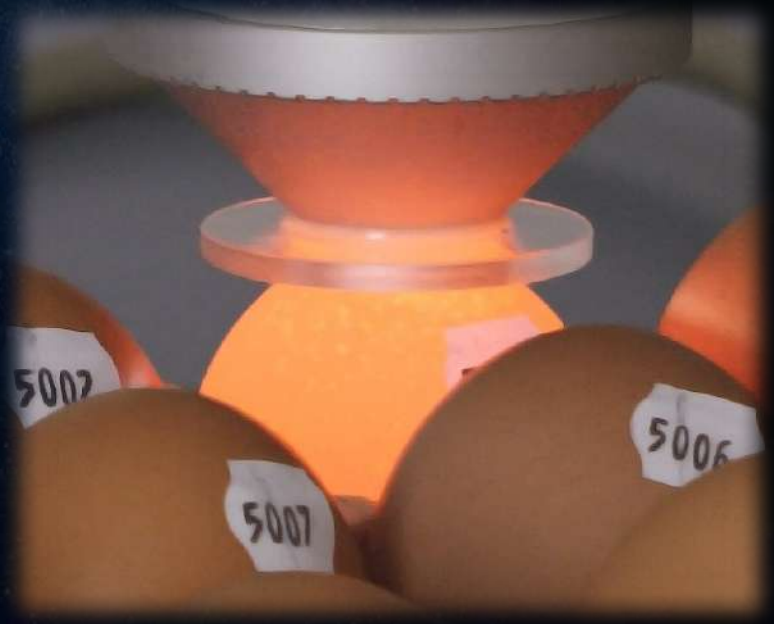

Selection for better feed efficiency

- **Sufficient feed intake at greatest nutrient demand**
- Focus is not only in FCR, but mainly in IOFC
- **No special high-density diet – Flexible in raw material**
- Feed intake according to production

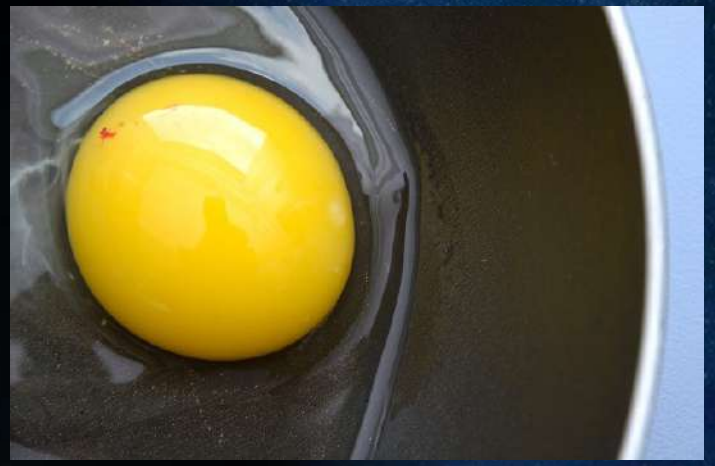
Selection for good eggshell colour

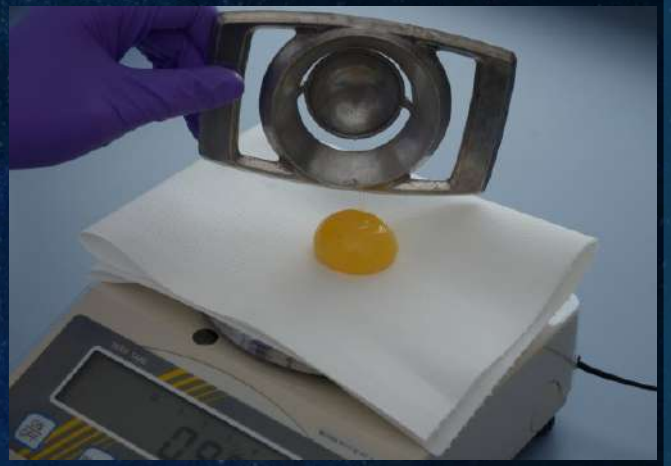
An attractive and uniform brown/cream/white shell colour

Good shell colour until the end of production



Selection for better internal egg quality



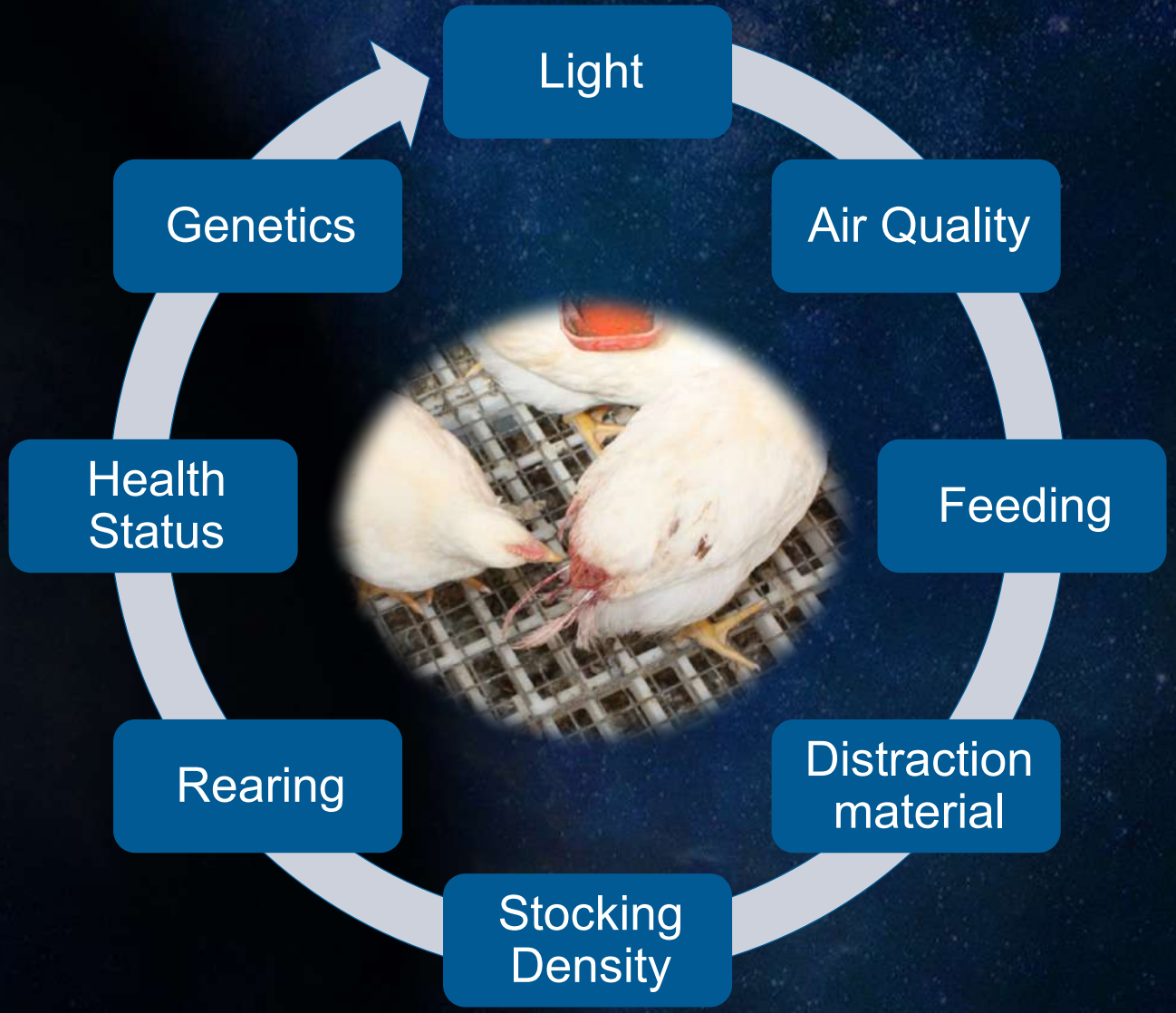


H.U.: maintain the aesthetic appearance of a fresh egg

Blood & meat spots: decrease number & size

Yolk %: increase the % solids

Feather pecking & cannibalism



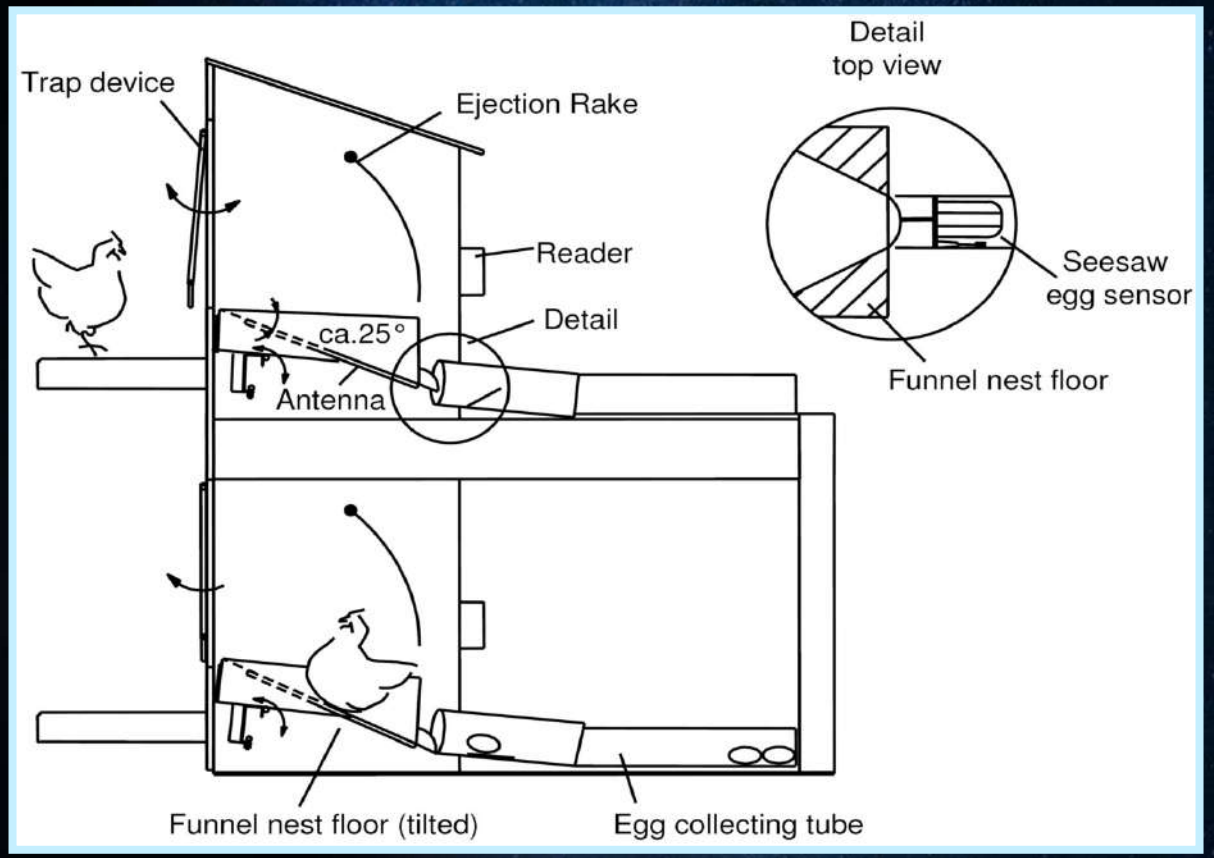
Better behaviour

Selection for low mortality, calmness & good feather cover

Automatic Trap Nesting

Increase of Saleable Nest Eggs

No more!

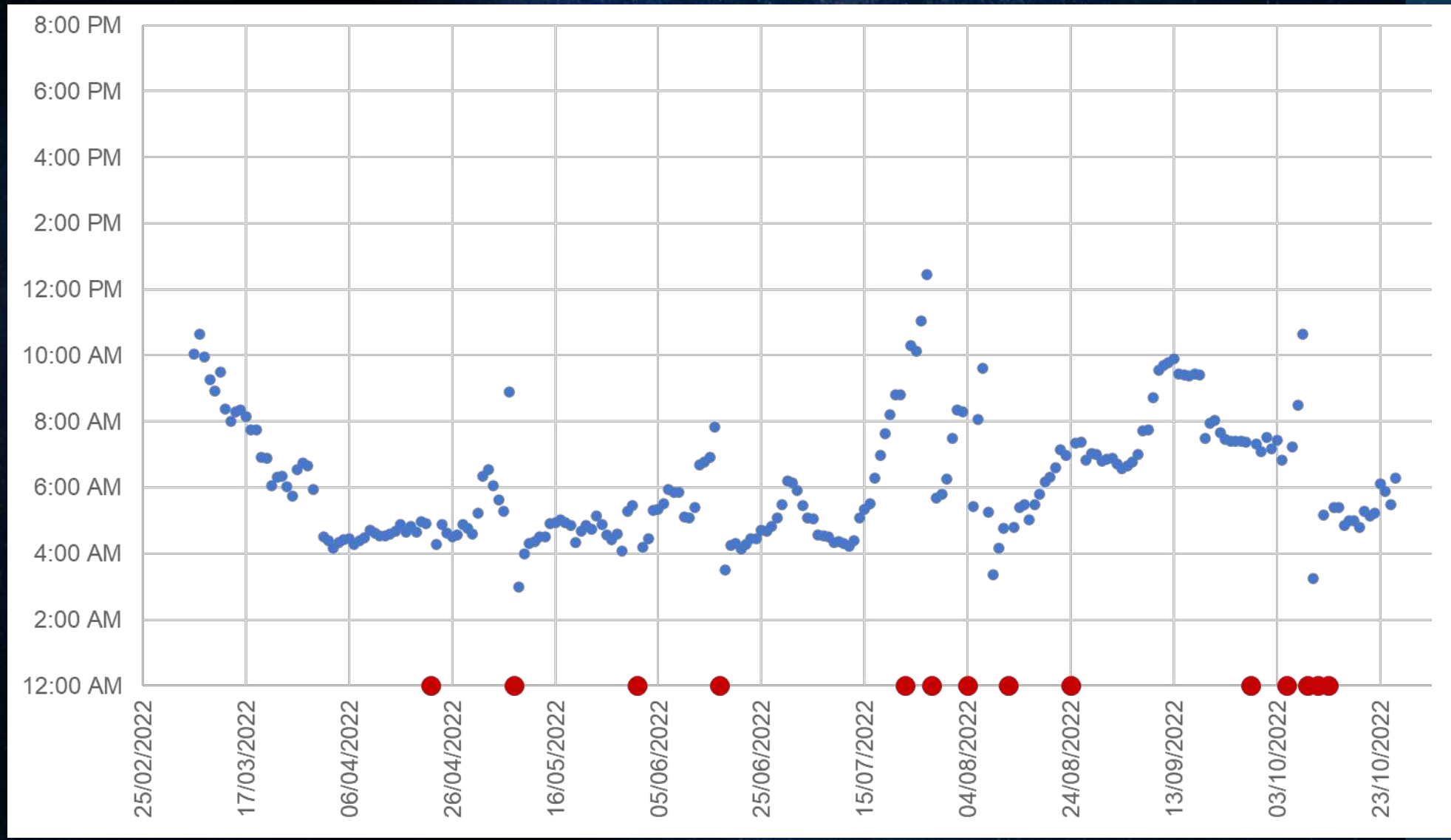


Transponder

Automatic Trap Nest

Floor System

Evaluating Nesting Behaviour



Adaptability to different environments



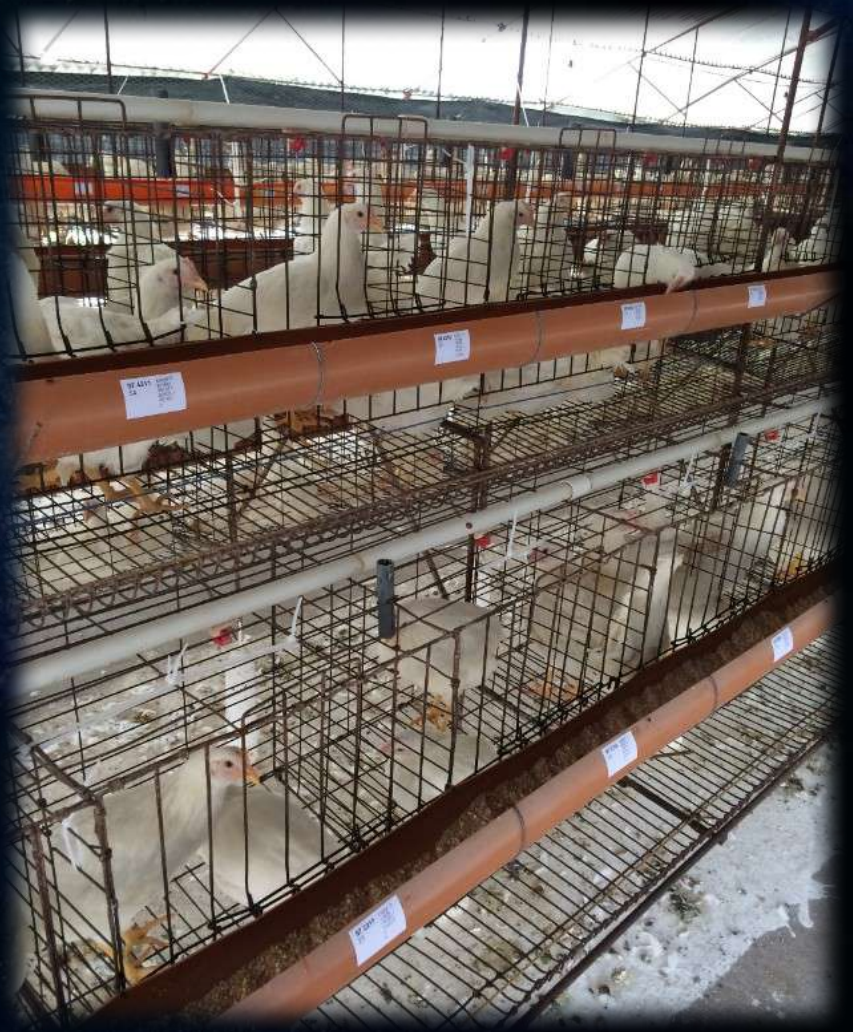






Field Test - Performance recording

Birds tested in several continents



Performance Testing:

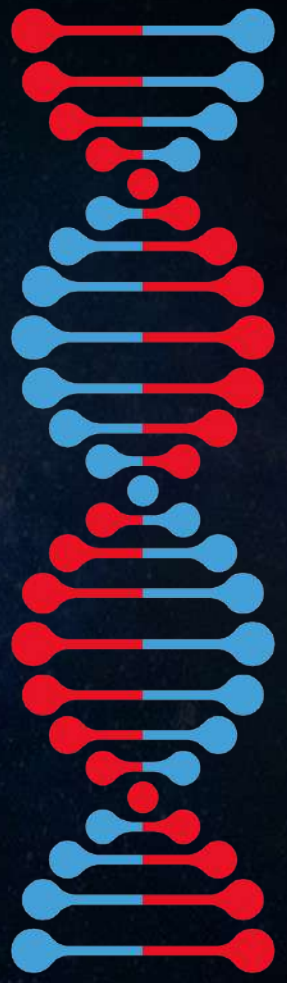
- ✓ Egg Production
- ✓ Egg Quality
- ✓ Livability
- ✓ Plumage Condition
- ✓ Feather Pecking

Feed Challenge

Comercial Farms – Crossline Testing

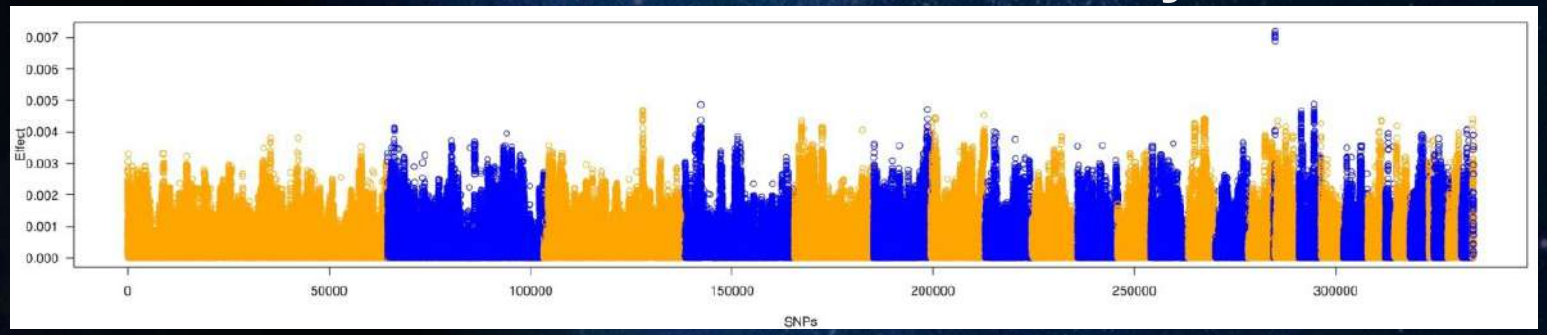
Diluted feed (Lower CP, unbalanced aa) – Bad feed structure

Genomic Selection



DNA Analysis

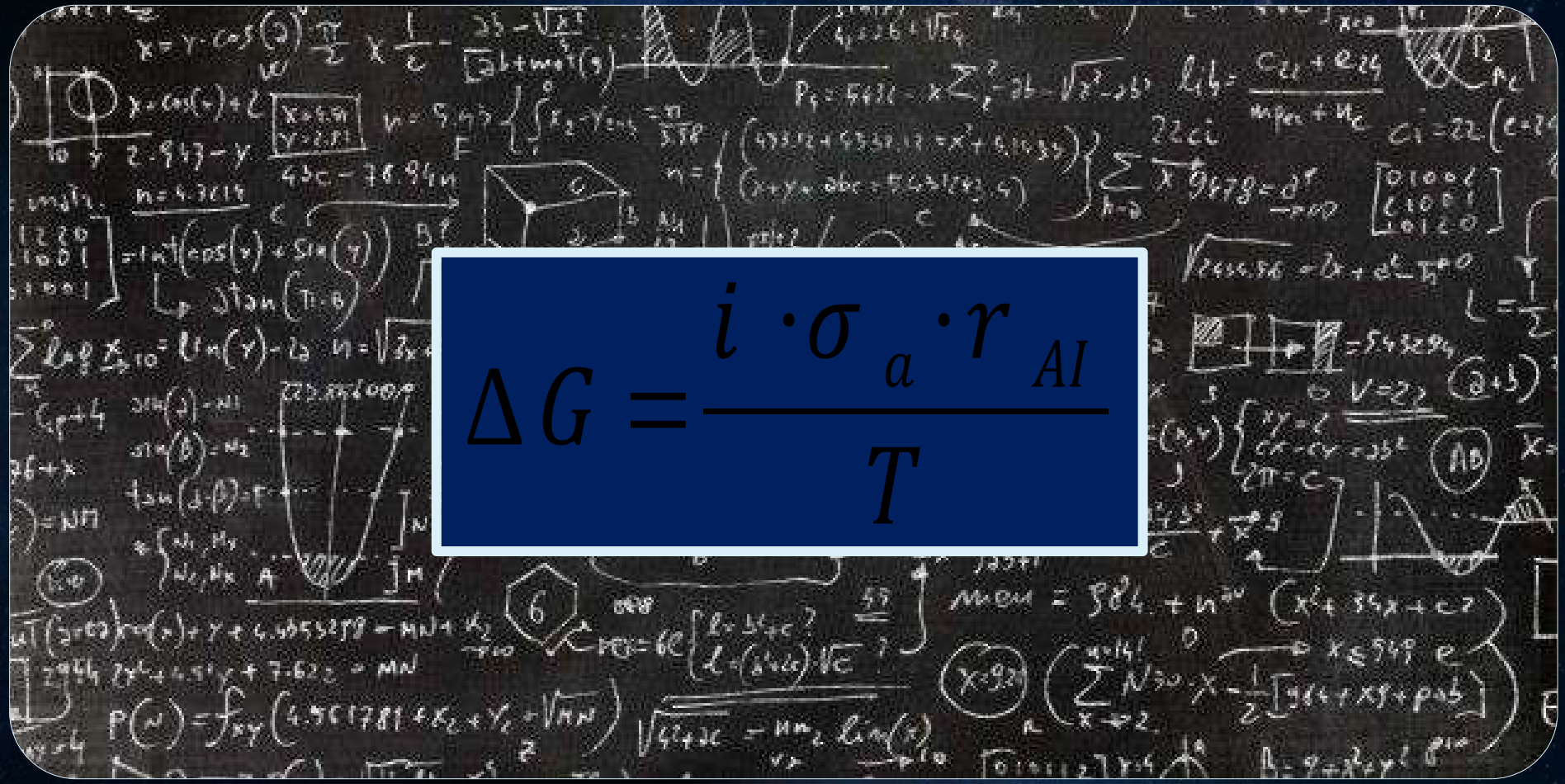
Effects for all markers simultaneously estimated



- MD 50k SNP-Array
- By-product: Pedigree check
- Better use of genetic variation

More Genetic Progress!

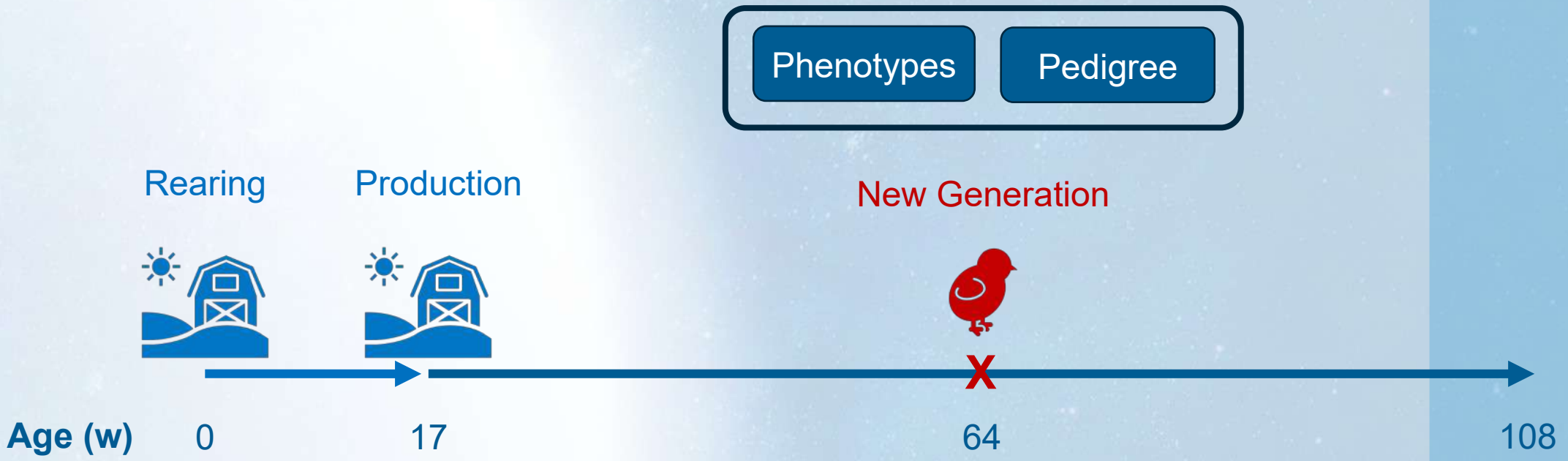
Genetic Progress Equation



$$\Delta G = \frac{i \cdot \sigma_a \cdot r_{AI}}{T}$$

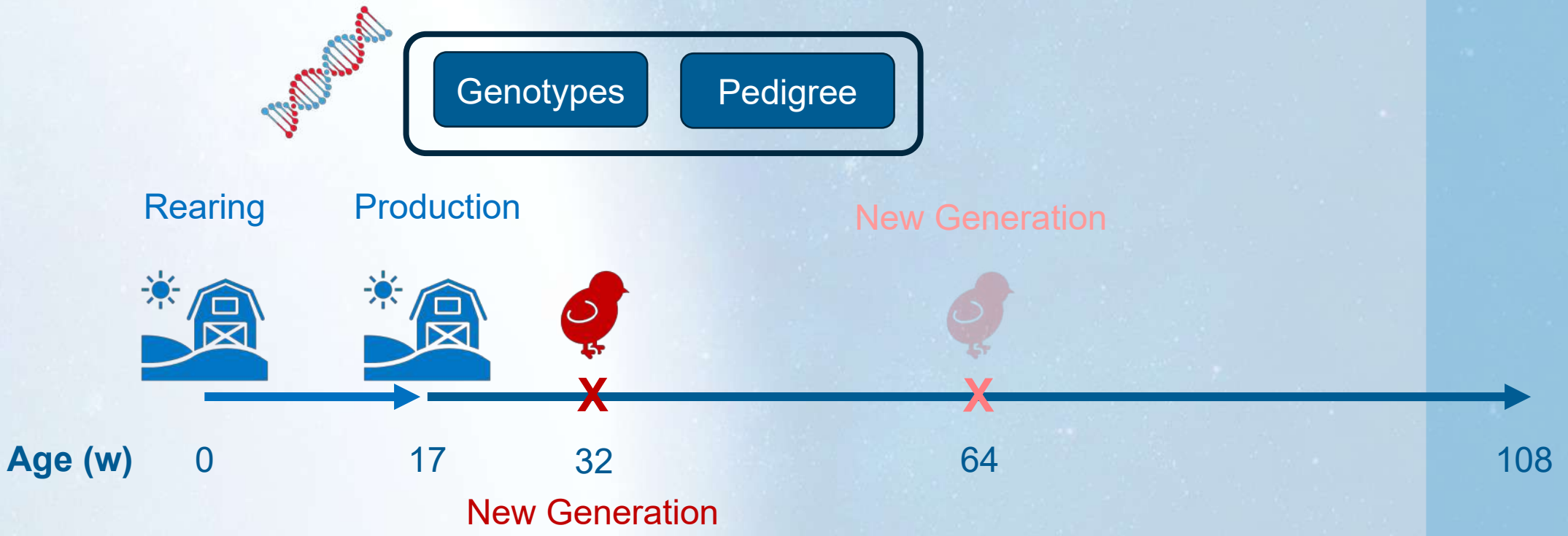
Genetic Selection

Generation Interval - Past



Genomic Selection

Shortening Generation Interval - Present



New Traits - Artificial Intelligence

- Automatic data collection
- **Transform data to information:**
  - ✓ Tracking the animal
  - ✓ Activity
  - ✓ Behaviour
  - ✓ Fitness

Added Value Proposition

Sustainability of the Egg Industry

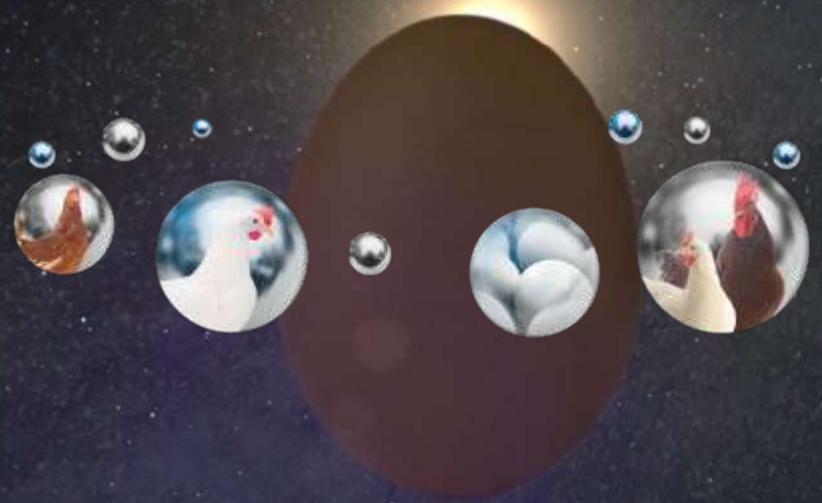
More Production

Better Liveability

Higher Efficiency

Greater Adaptability

Thank you for your attention!



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