

# Chasing the best H&N bird - Alternative Systems -

Dr. David Caverio Pintado

# Data Recording

## Breeding Farms

Single Cages



Group Cages



Cage-Free



# Data Recording

## Field Testing – Commercial Farms

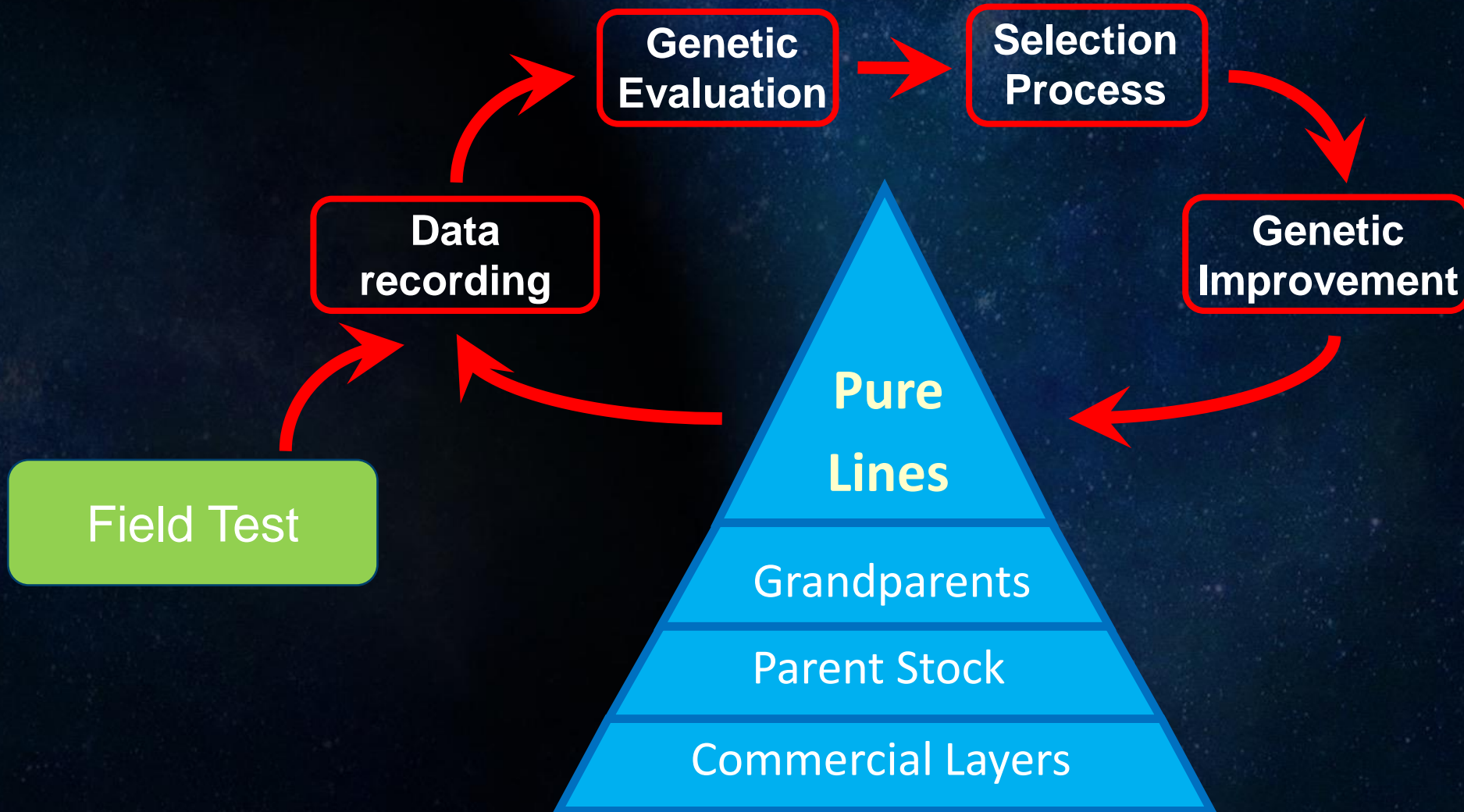
Group Cages



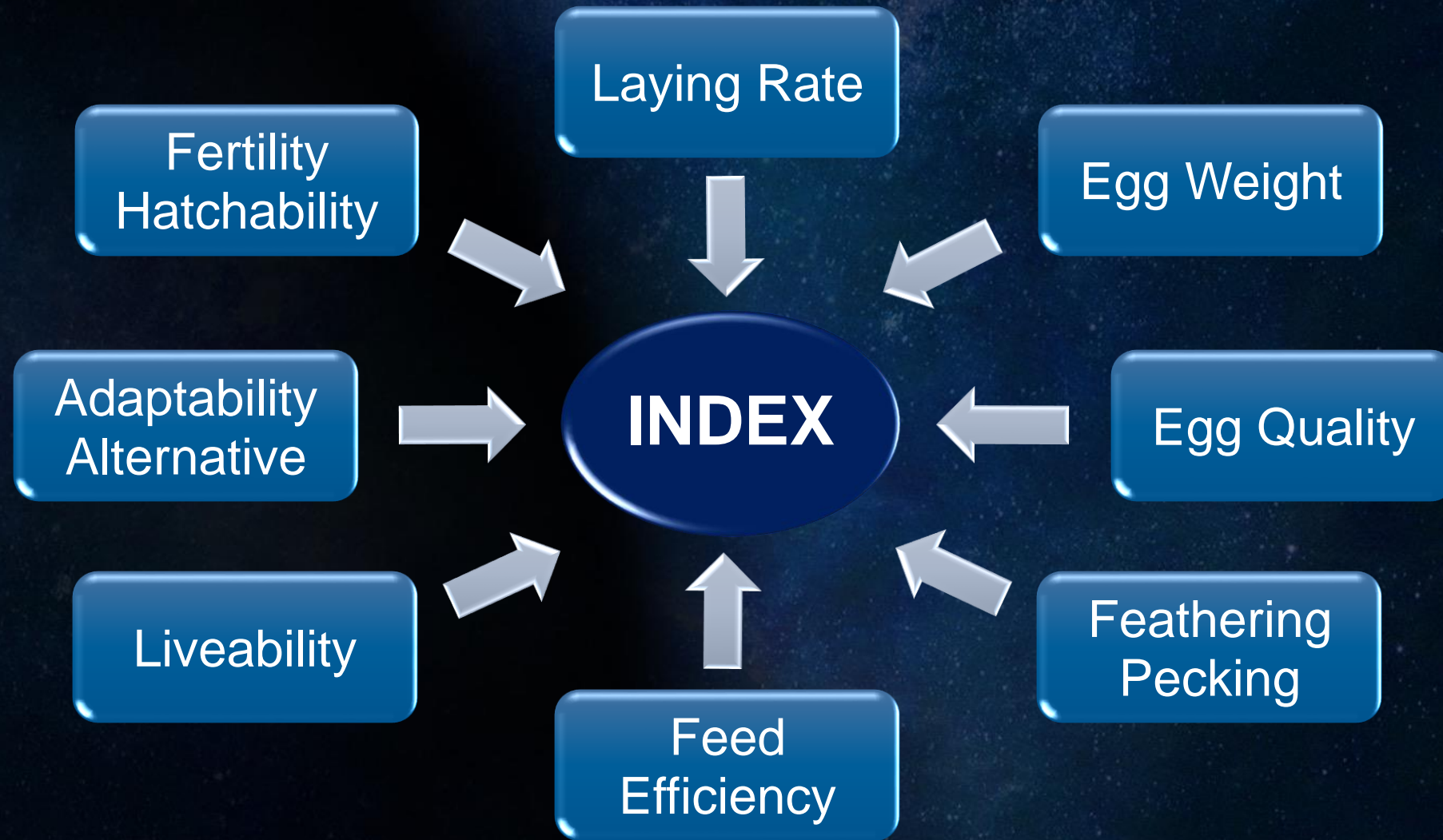
Free Range



# Structure of the Laying Breeding



# Balanced Selection



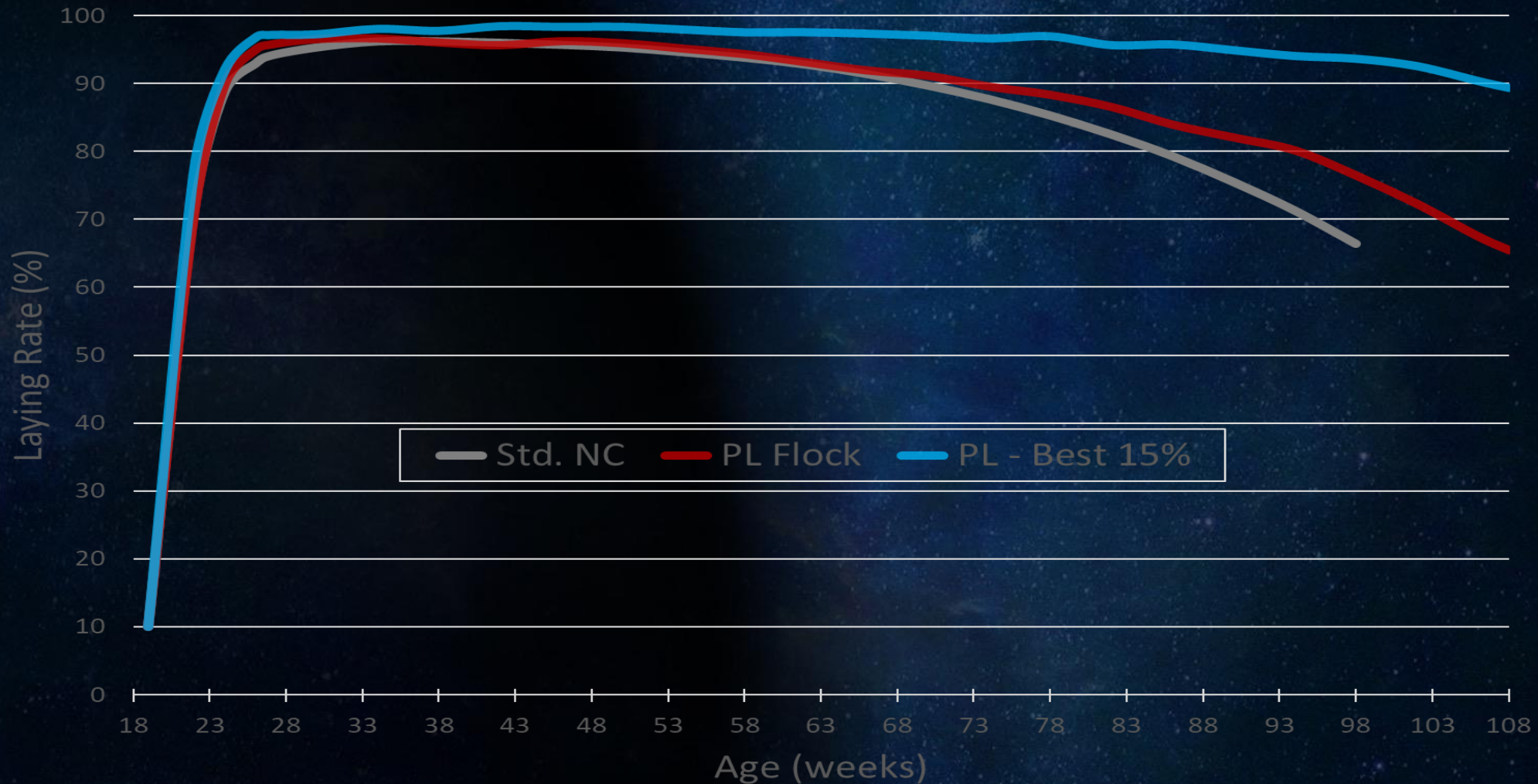
# Daily Egg Recording

Only saleable eggs are counted!



# Laying Performance - Persistency

## White Pure Line



# Eggshell Strength

Eggs breaks at the right time!



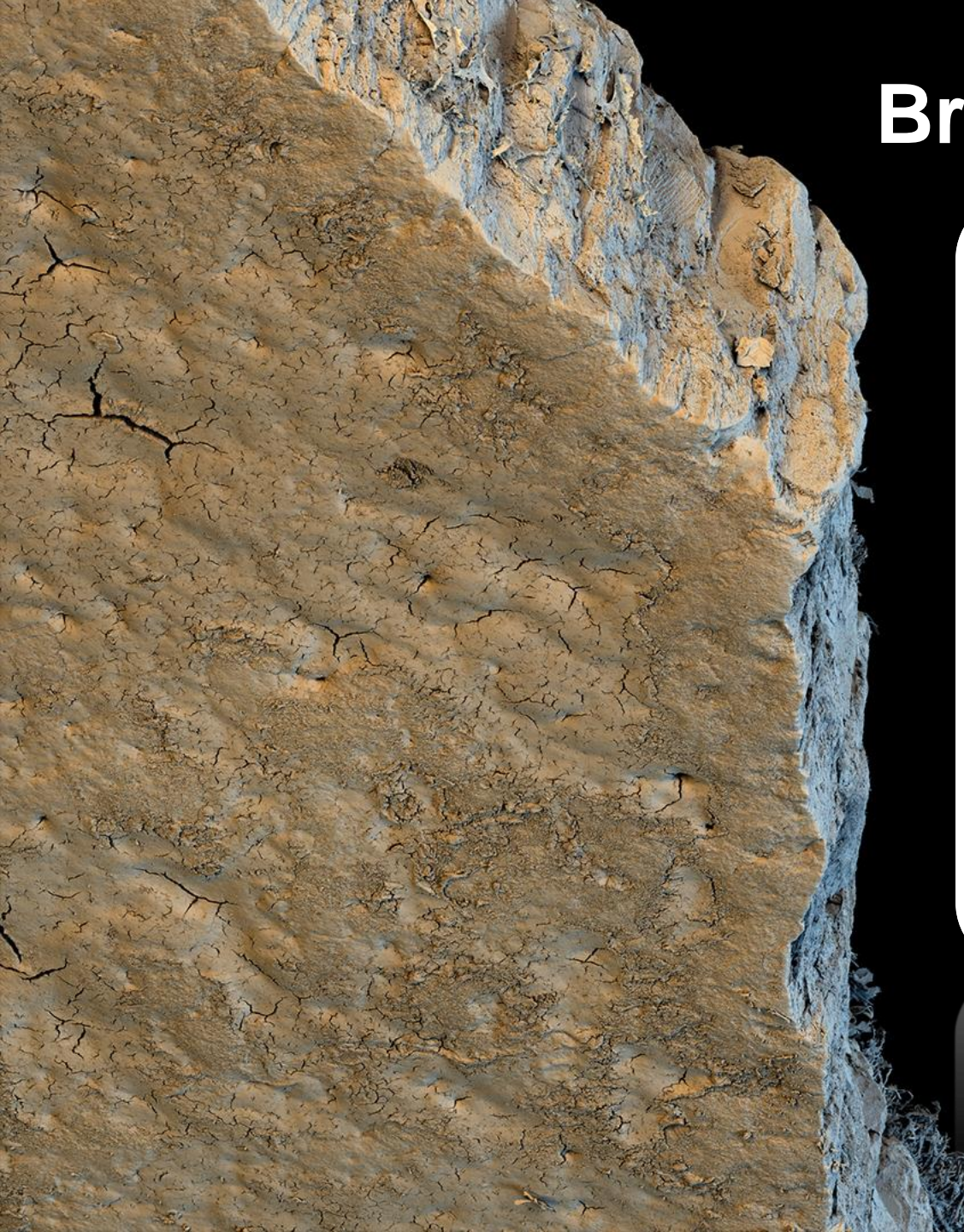
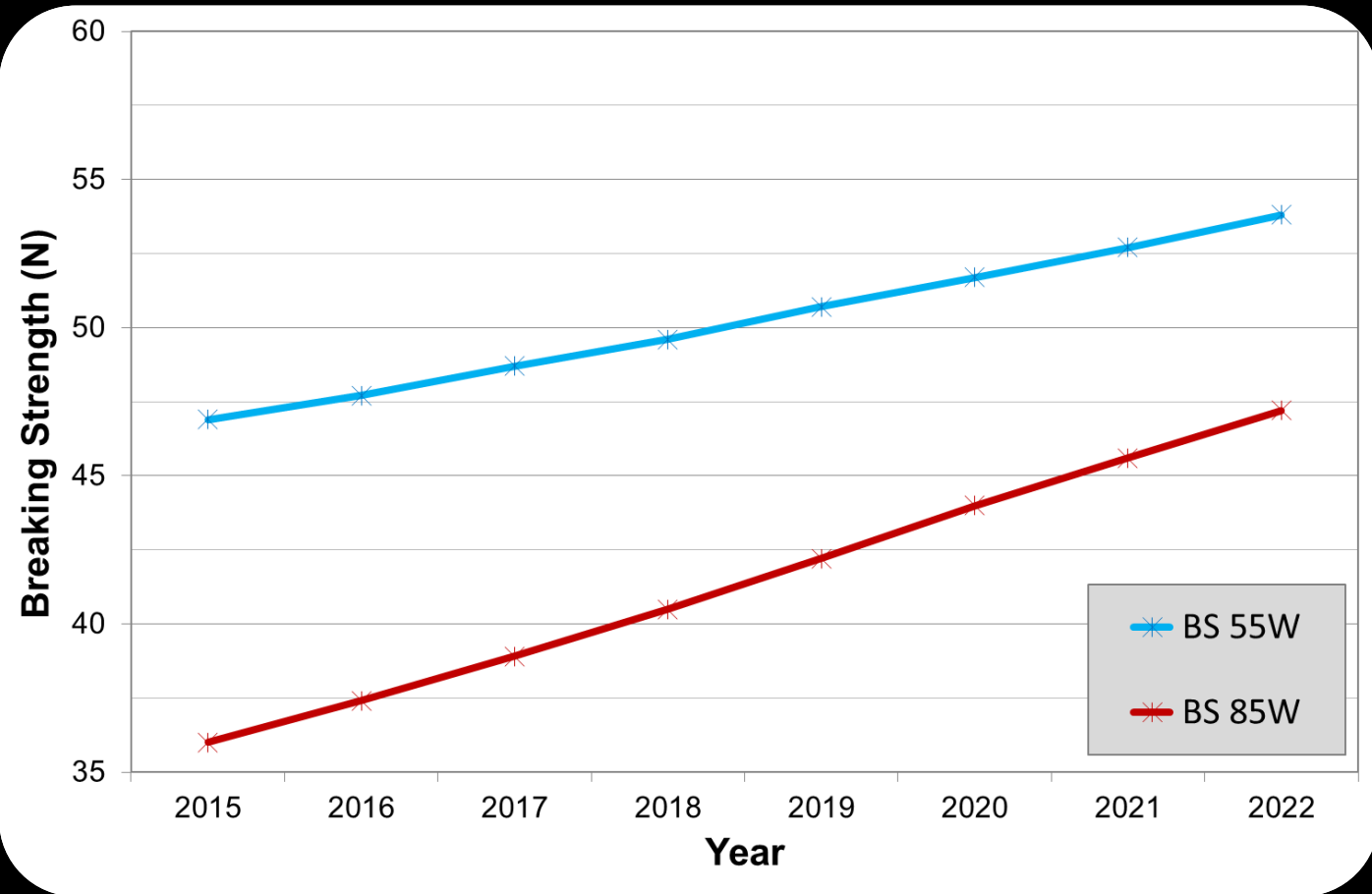
## Selecting for a better eggshell:

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





# Breaking Strength



# Egg Weight



## Influencing Factors:

- Light stimulation, Body Weight, Feed
- Genetic –  $h^2 \sim 0.6$



## Goals:

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

# Rearing: An investment for the future

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

Good  
Immune  
System



Feed  
Intake  
Capacity

**Train the birds to eat and drink at different levels**  
**Encourage bird activity throughout the system**

# 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

# Feed Challenge

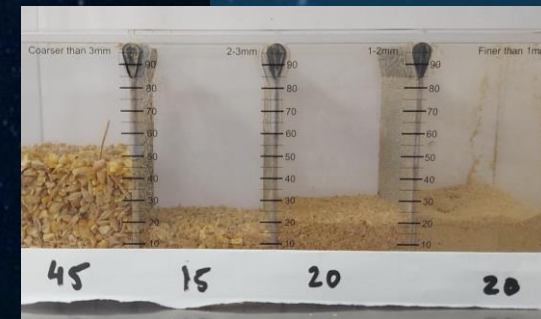
Pure Line Farms – Group Cages – monthly change

**EU – 2700 kcal**

Wheat/Barley/Corn/Soja/Rapeseed/Sunflower

**US – 2850 kcal**

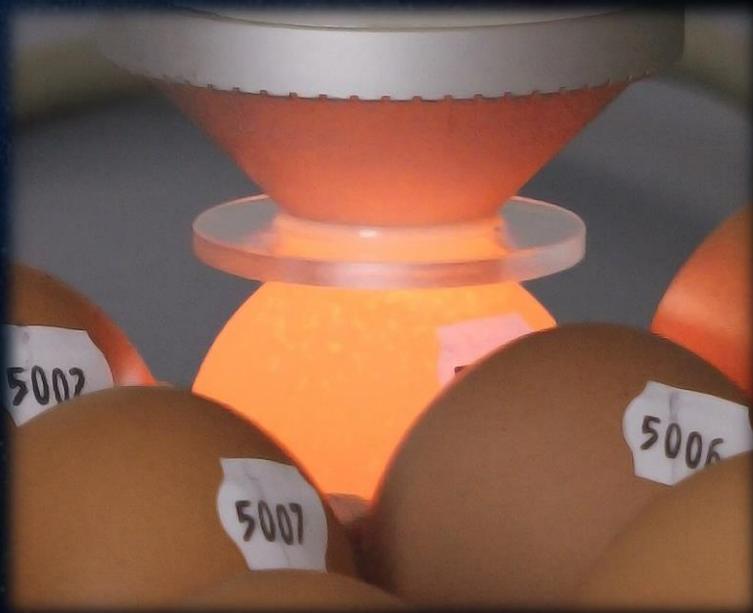
Corn-Soja



# Selection for good eggshell colour

An attractive and uniform brown/cream/white shell colour

Good shell colour until the end of production



# Adaptability to different environments



# Field Test - Performance recording

Birds tested in several continents



## Performance Testing:

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

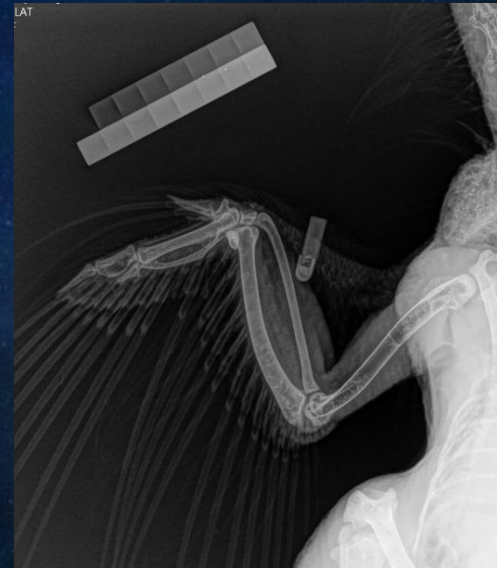
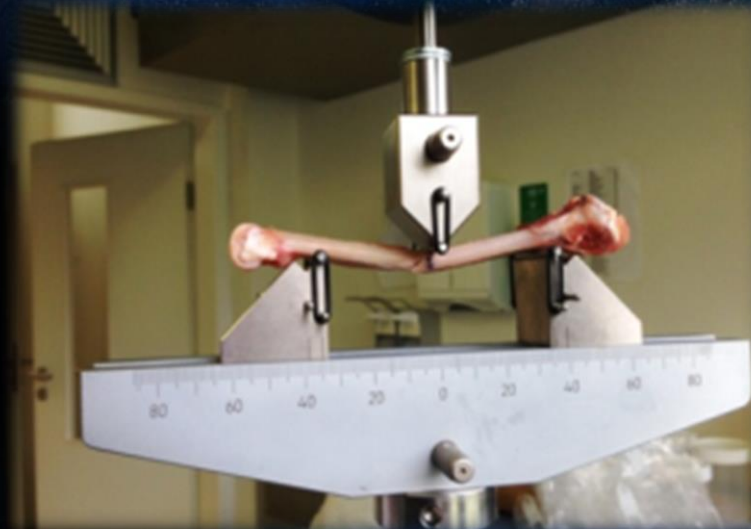


# Feed Challenge

Comercial Farms – Crossline Testing

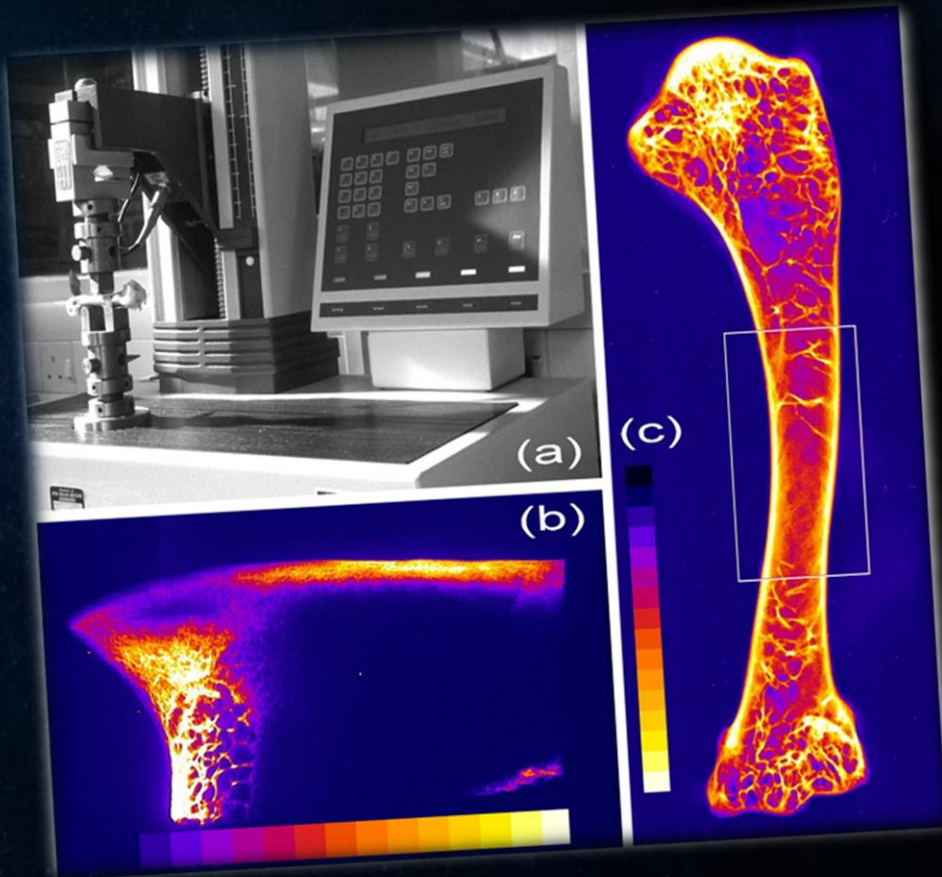


# Improve Bone Stability



# Bone Quality

## Post-mortem Bone Quality



- ✓ No neg. correlation with persistency ( $r_g=+0.25$ )
- ✓ No link to BS ( $r_g=\pm 0.1$ )
- ✓ Neg. correlation with early maturity ( $r_g=-0.73$ )
- ✓ Well-mineralised medullary bone is important for skeleton quality
- ✓ Keel bone is hard to measure and  $h^2=0.03$

(Source: Dunn et al., 2021)

# Better behaviour

Selection for low mortality, calmness & good feather cover



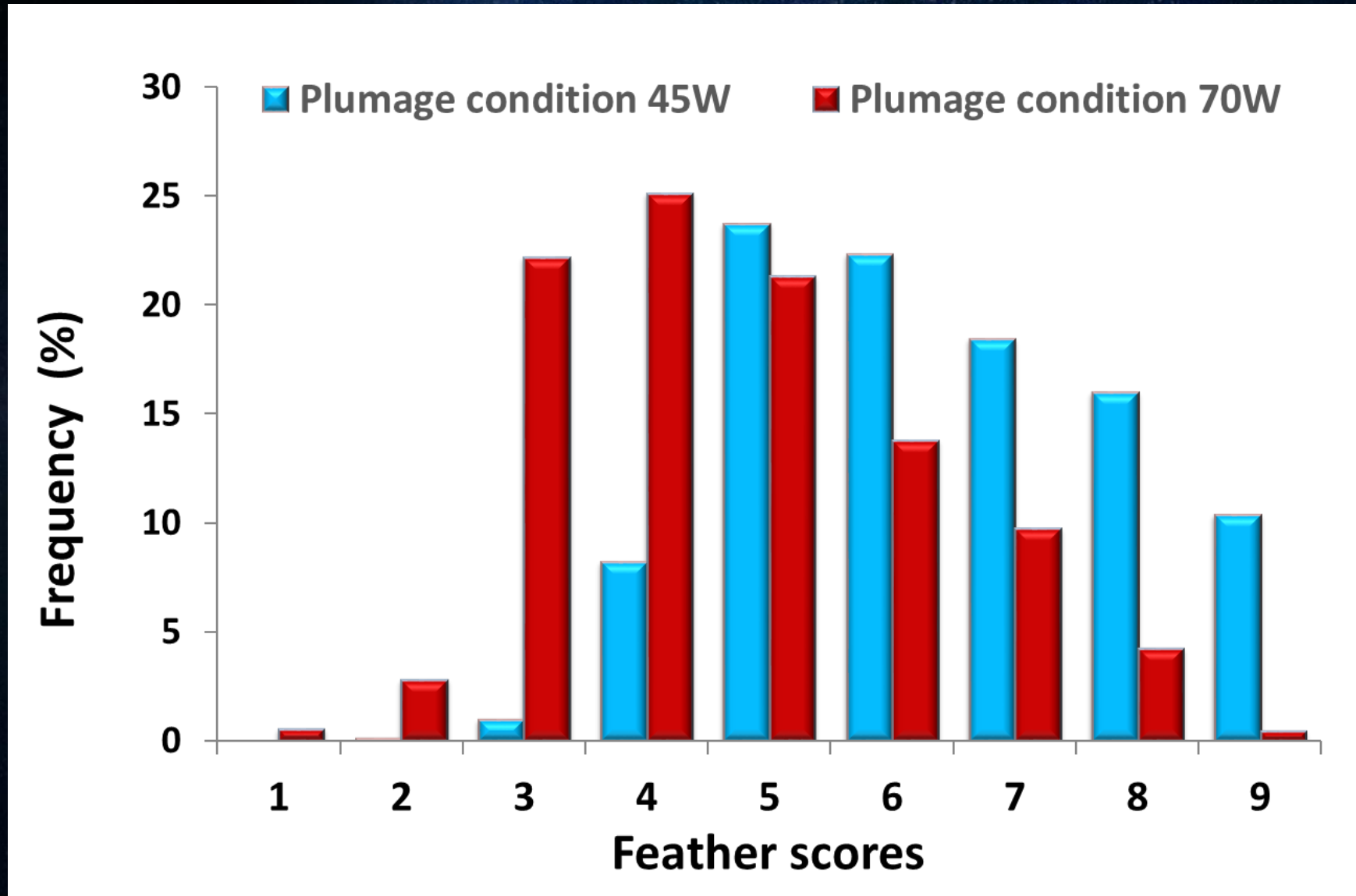
# Challenge Test for better feather cover

## Pure-line birds (Sib-test)



- 72 hens/cage – No males
- Challenge Feed (No-Soja-Feed)
- High Light intensity & No beak treatment
- $h^2 \sim 0.23-0.42$

# Purelines in Sib-Test



# End of beak treatment...??



# Selecting for better Beak Shape



Blunt Peak → less injuries!

$h^2 \sim 0.15 - 0.25$



# Beak length



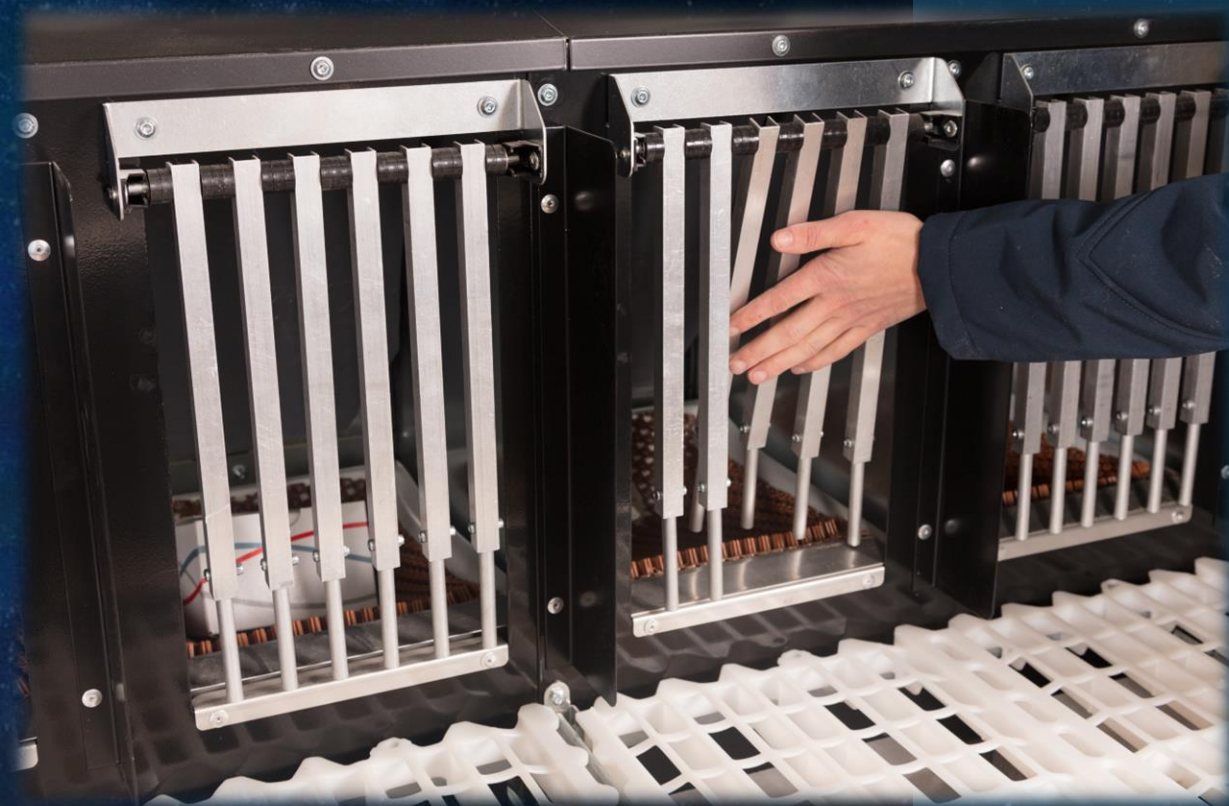
Beak length

-0.20

Feather cover

# Automatic Trap Nest

## Floor System

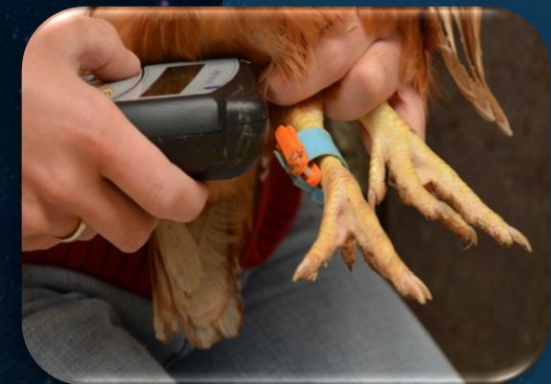
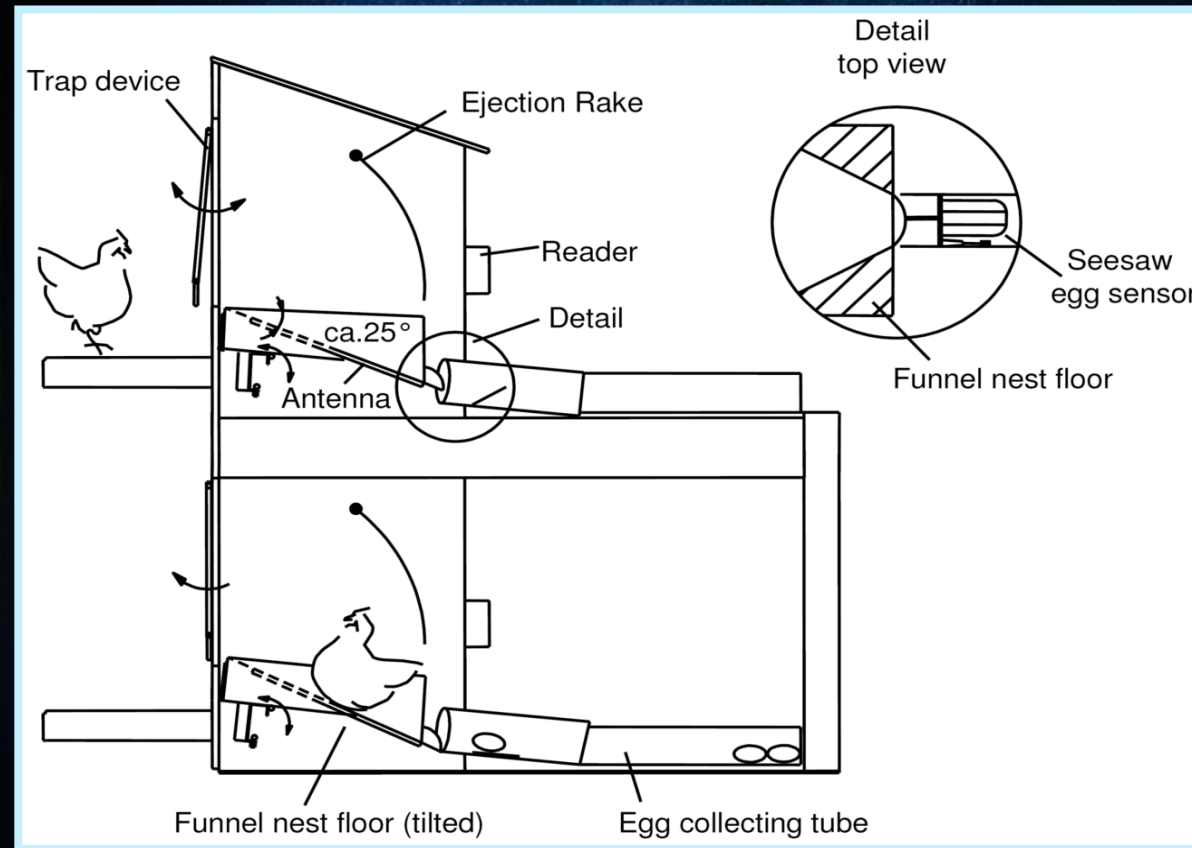


# Automatic Trap Nesting

Increase of Saleable Nest Eggs



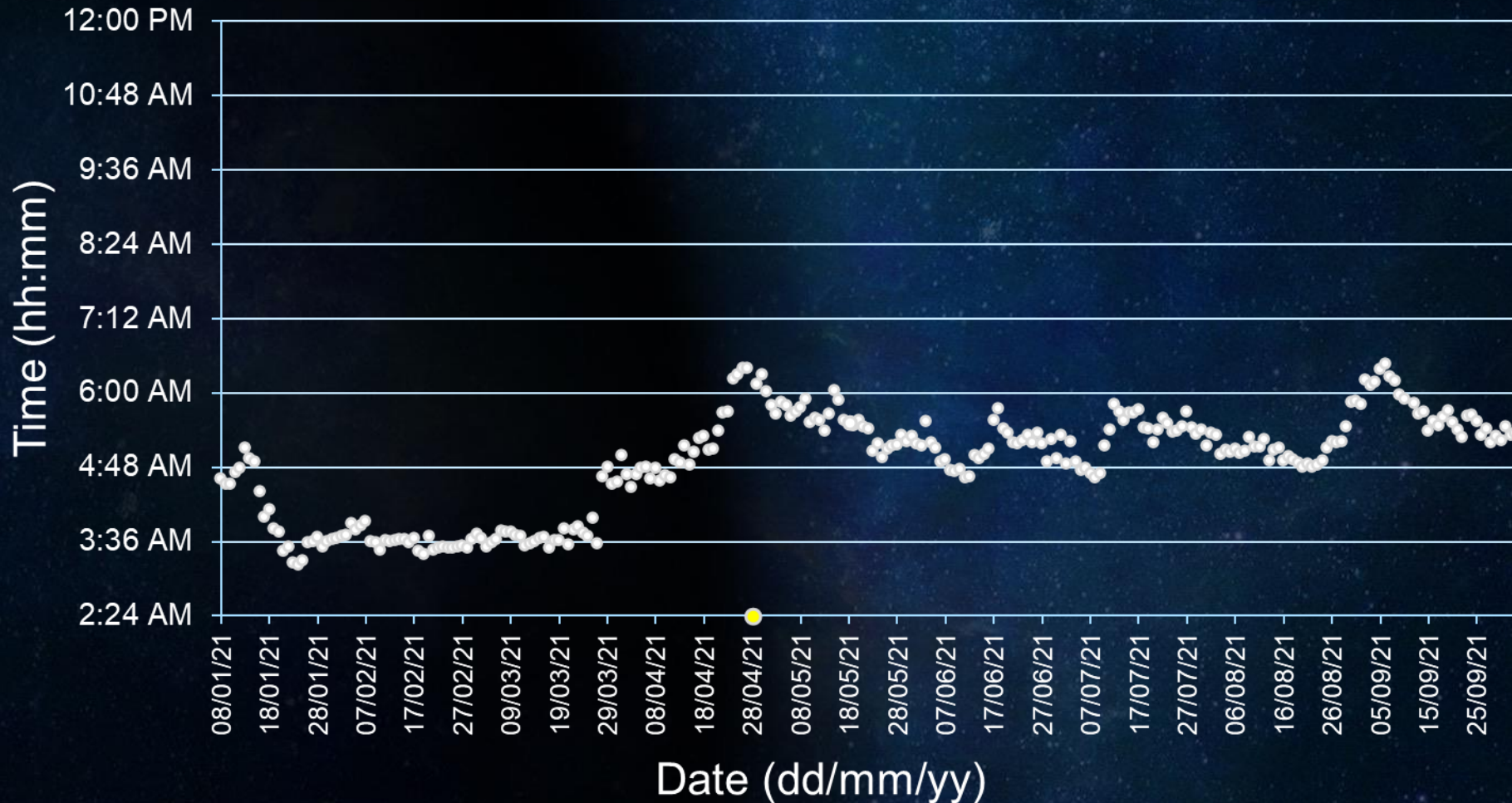
**No more!**



**Transponder**

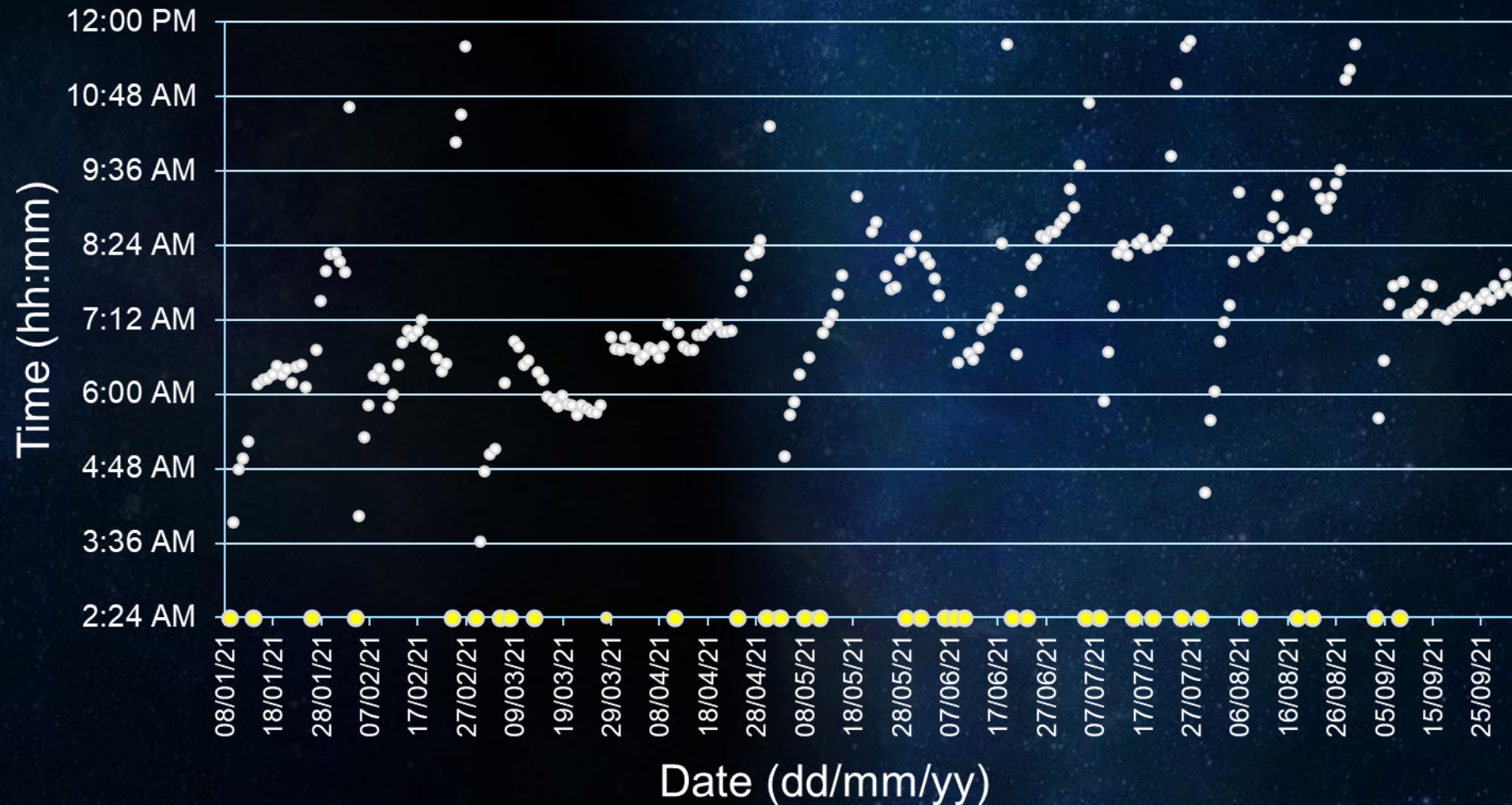
# Laying time

Brown egg line – 268 Eggs in 269 production days (99.6%)



# Laying time

Brown egg line – 228 Eggs in 269 production days (84.7%)





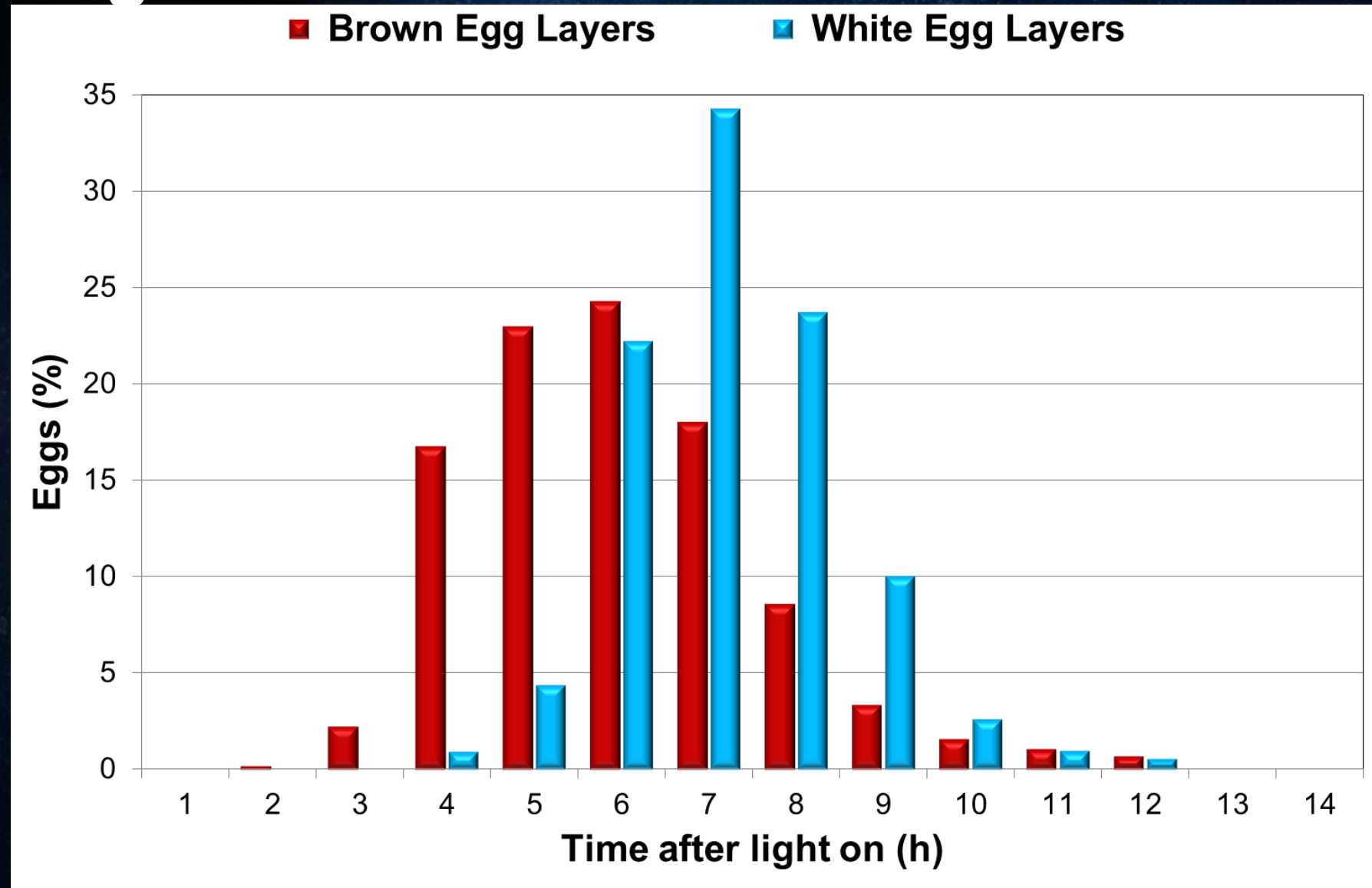
# Nesting behaviour

Trait	Brown layer	White layer
Oviposition time	8:00	9:45
Stay in Nest with oviposition	30 min	45 min
Stay in nest without oviposition	10 min	28 min

\* Switch on the light at 3:00



# Nesting behaviour





# Traditional Trap Nest in Russia

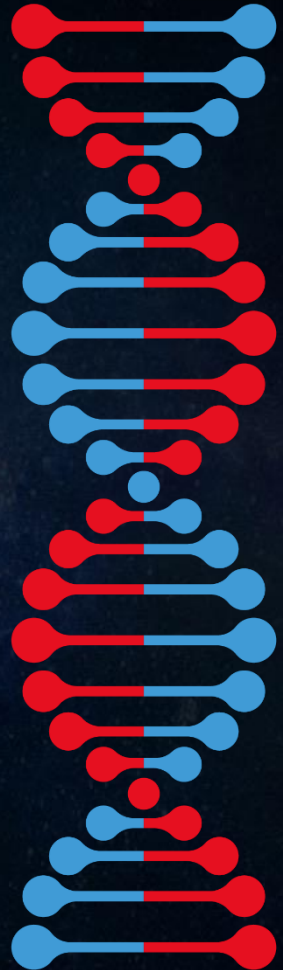


# Better behaviour

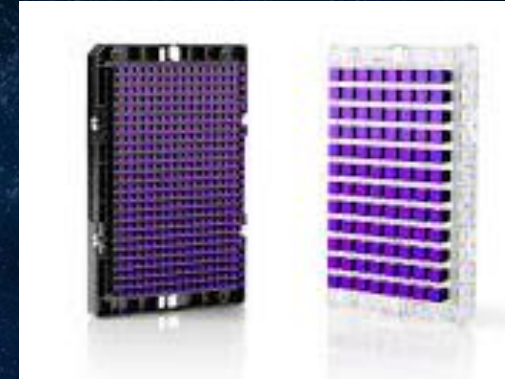
## Free-Range Test



# Genomic Selection



DNA Analysis



Axiom® 384/96 Format (Affymetrix)

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

**Higher genetic progress in layers**

# Genetic Progress Equation

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

# New Traits - Artificial Intelligence



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



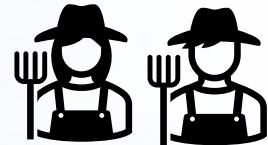
**Warnstreik**

**Verdi**

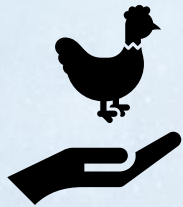
**Verdi**

# Take Home Message

Added Value Proposition - Sustainability of the Egg Industry



More Production



Better Liveability



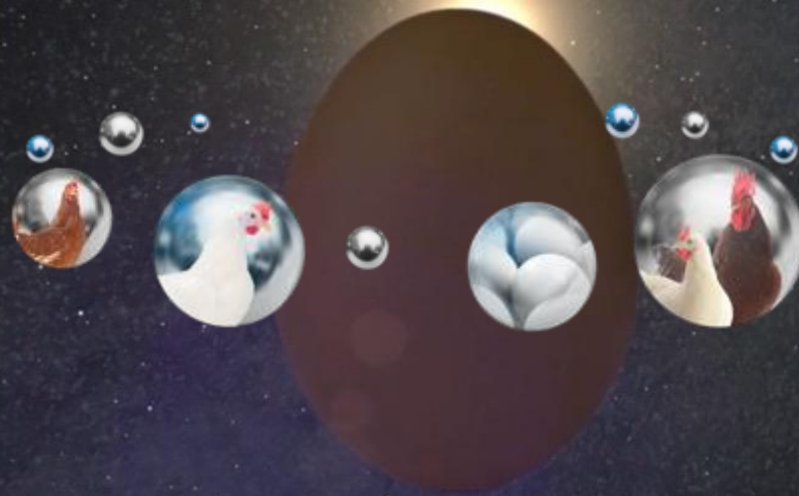
Higher Efficiency



Greater Adaptability



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