

H&N Genetics Update

5th H&N
DISTRIBUTOR
CONFERENCE
CAIRO

20th to 24th
OCT
2025

Dr. David Caverio Pintado

2025



Outline

- 1 Past
- 2 Present
- 3 Future

5th H&N
DISTRIBUTOR
CONFERENCE
CAIRO

20th to 24th
OCT
2025



Outline

- 1 Then
- 2 Now
- 3 Wow

5th H&N
DISTRIBUTOR
CONFERENCE
CAIRO

20th to 24th
OCT
2025



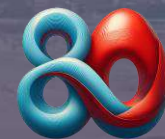
Past



The Old Good Times

5th H&N
DISTRIBUTOR
CONFERENCE
CAIRO

20th to 24th
OCT
2025



H&N
INTERNATIONAL



HEISDORF & NELSON FARMS, INC.





Individual Visual Assessment



5th H&N
DISTRIBUTOR
CONFERENCE
CAIRO

20th to 24th
OCT
2025



H&N
INTERNATIONAL

Egg Recording in Trap Nest



5th H&N
DISTRIBUTOR
CONFERENCE
CAIRO

20th to 24th
OCT
2025



H&N
INTERNATIONAL



Pedigree Hatch

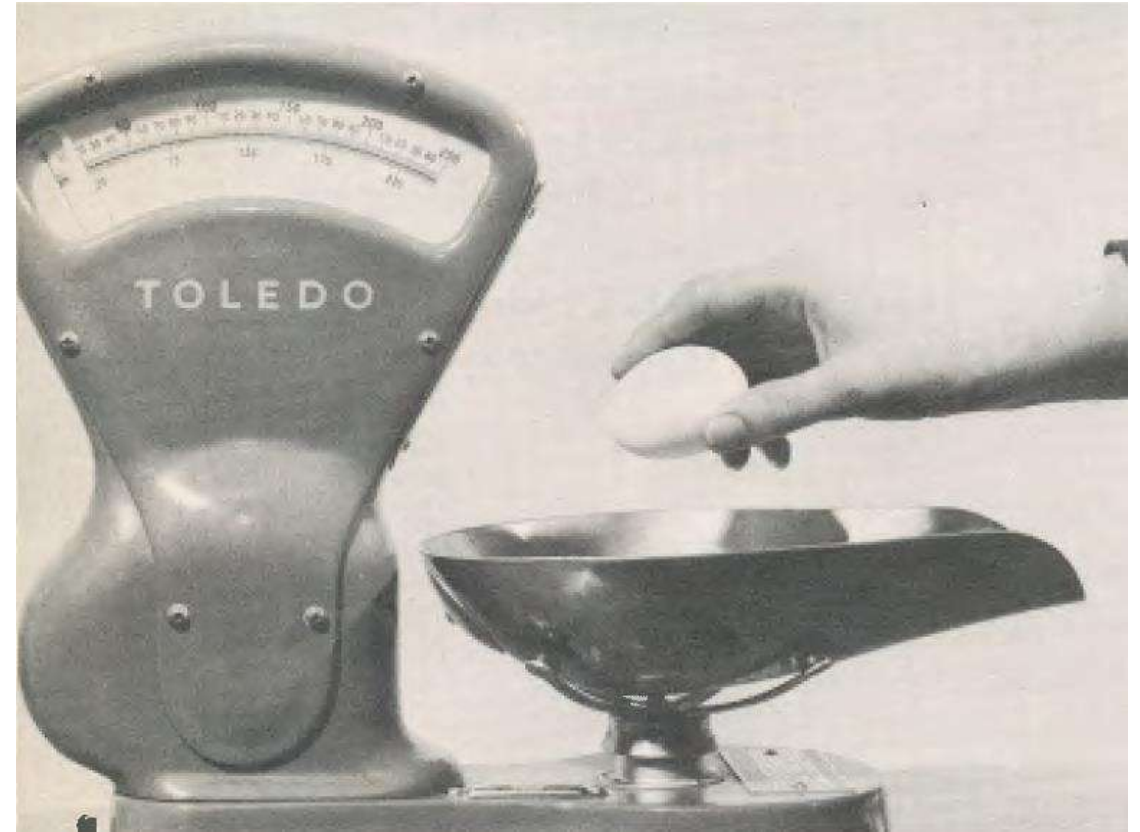
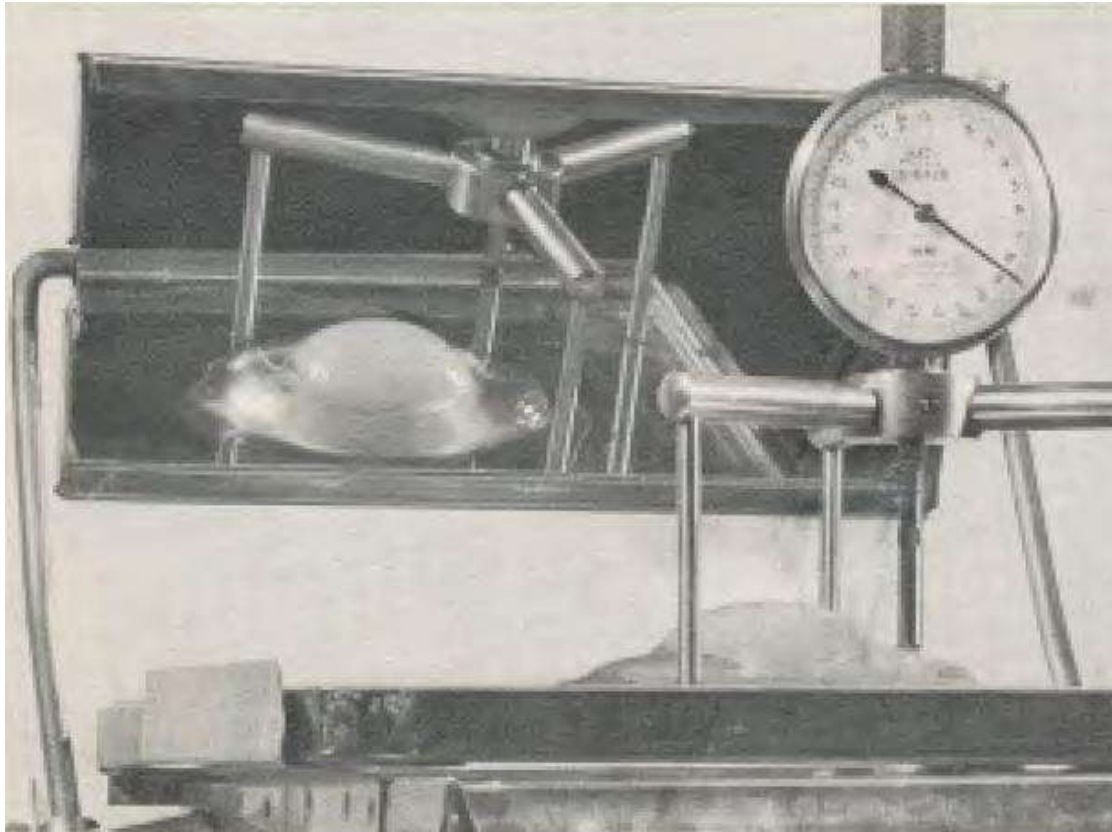


5th H&N
DISTRIBUTOR
CONFERENCE
CAIRO

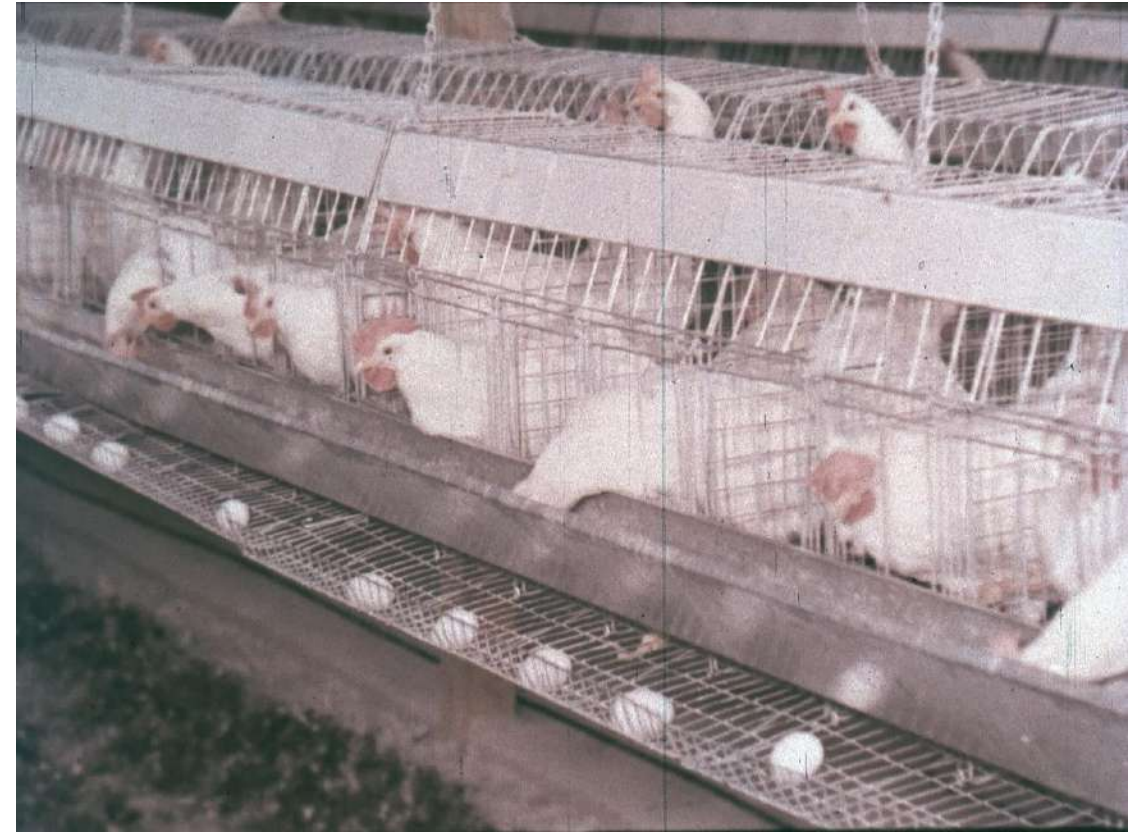
20th to 24th
OCT
2025



Egg Quality



Egg Collection and recording - Cages



5th H&N
DISTRIBUTOR
CONFERENCE
CAIRO

20th to 24th
OCT
2025



H&N
INTERNATIONAL

Data processing and analysis



Information is "written" into cards by a series of punched holes.



Punched cards represent the history of an individual bird's performance.



Performance histories can be summarized by machine for genetic evaluation.

Data processing and analysis



5th H&N
DISTRIBUTOR
CONFERENCE
CAIRO

20th to 24th
OCT
2025



H&N
INTERNATIONAL





Geneticists – Best Trained PhD



Cecil McClary



Franz Pirchner



Max von Krosigk



Mel Hoggsett



Ken Goodwin

5th H&N
DISTRIBUTOR
CONFERENCE
CAIRO

20th to 24th
OCT
2025



Geneticists – Best Trained PhD



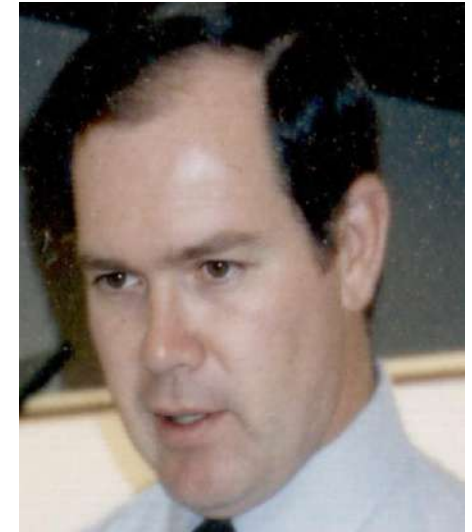
Gerry Havenstein



Dietmar Flock



Alan Emsley



Dick Towner



EW-Group

Growing Excellence Through Innovation



5th H&N
DISTRIBUTOR
CONFERENCE
CAIRO

20th to 24th
OCT
2025



Chief Geneticist at H&N under EW-Group

- ✓ Implementation of REML+BLUP in the 90s
- ✓ Modernisation data recording
- ✓ Testing in different environments
- ✓ Focus on sustainability
- ✓ Introduce Genomic Selection in the 2010s



Prof. Flock



Prof. Preisinger

Present



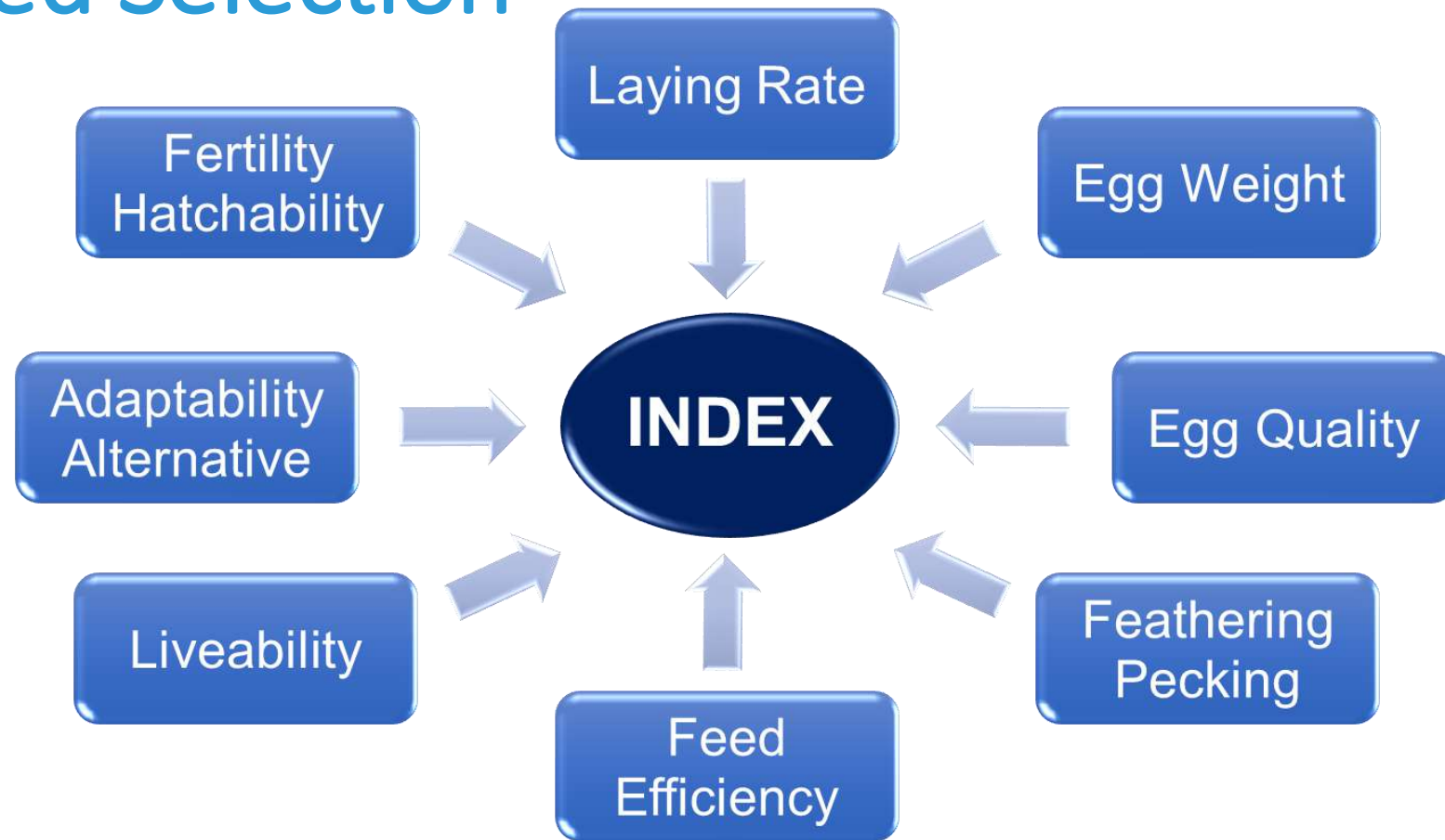
The age of Constant Updates

5th H&N
DISTRIBUTOR
CONFERENCE
CAIRO

20th to 24th
OCT
2025



Balanced Selection

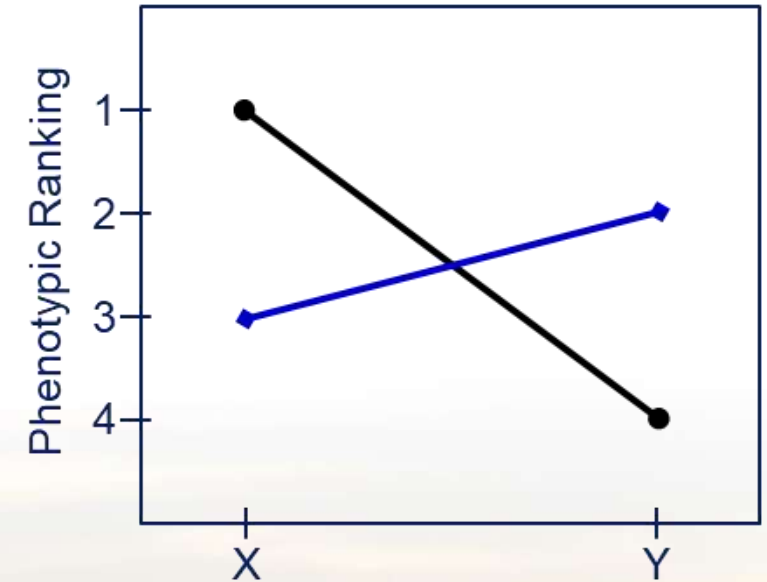




Expansion of Crossline – Field Conditions

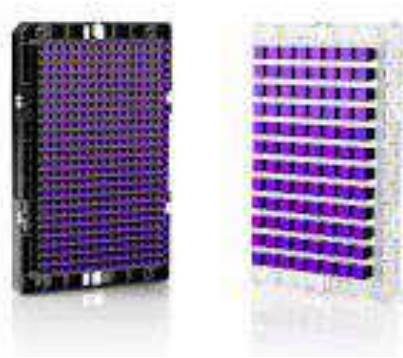
Test birds in several countries worldwide

- ✓ Under real challenges
- ✓ Different feed quality
- ✓ Hot climate conditions



Avoid GxE Interactions

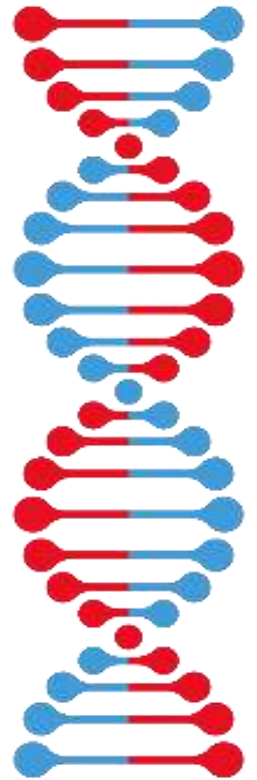
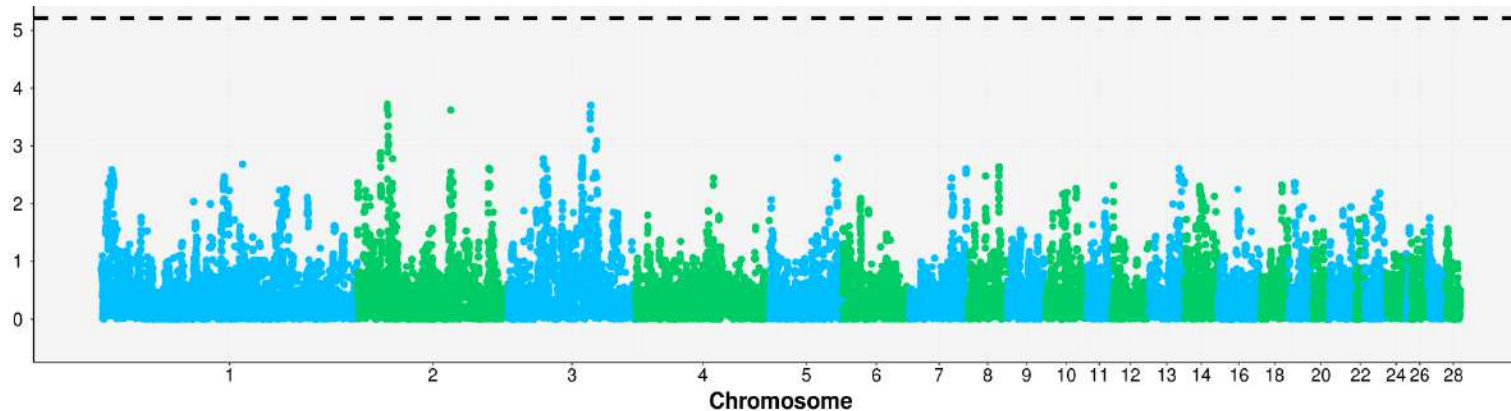
Genomic Selection



Axiom® 384/96 Format (Affymetrix)



GeneTitan® Array Processing (Affymetrix)



DNA Analysis

Extended Cycles >100 weeks

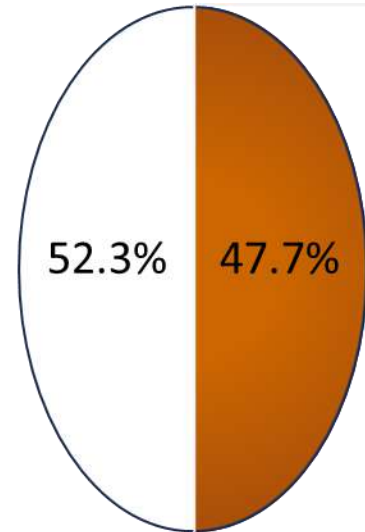


PS-Flock Data (Hatch in 2022-2023)

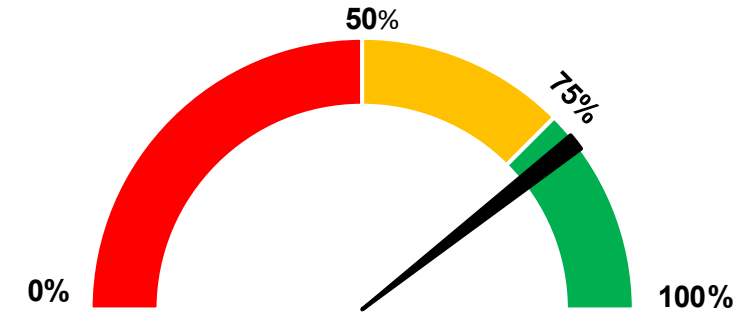
	Country	No. Flocks
1	Netherlands	27
2	Russia	21
3	USA	20
4	Colombia	17
5	Brazil	16
6	Guatemala	12
7	Switzerland	10
8	Canada	7
9	UK	7
10	Argentina	6
11	Zimbabwe	6
12	Portugal	5
13	France	4
14	Hungary	4
15	Morocco	4
16	Nepal	4
17	Ecuador	3
18	Italy	3
19	Belgium	2
20	Malaysia	2
21	Philippines	2
22	Poland	2
23	Sri Lanka	2
24	Bolivia	1
25	Egypt	1
26	Taiwan	1
	Total	189



1.24 M



1.14 M

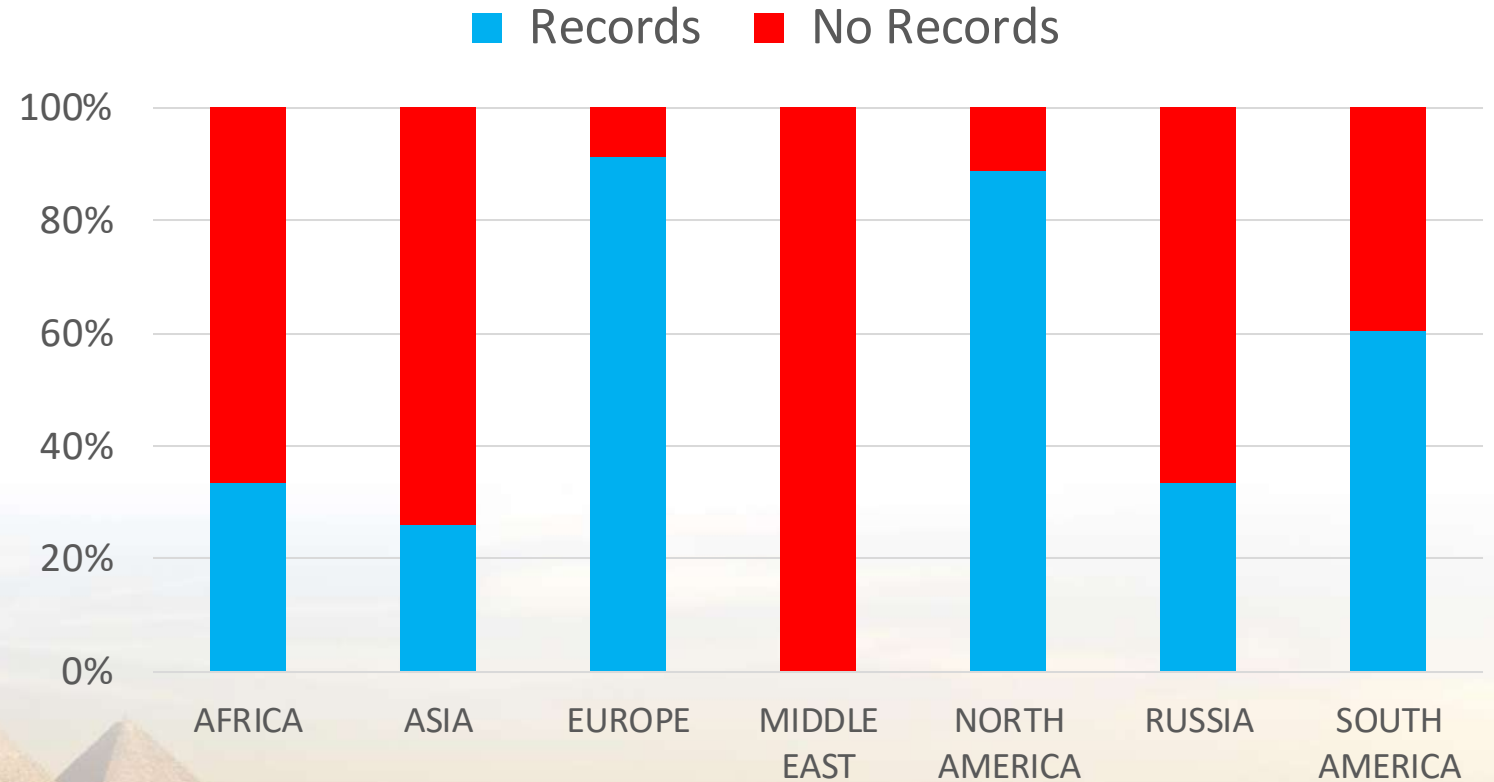


% of Flocks that reached $\geq 70w$

77%

Deliveries 2022-2023

- ✓ 305 PS-Deliveries
- ✓ Data: 190 (62%)



Comparison 2017-19 vs 2020-21 vs 2022-23

70 weeks	White-PS		
	17-19	20-21	22-23
N Females (M)	0.46	1.21	1.27
N Flocks	48	96	83
Liv (%)	92.5	93.0	94.6
EN HH	308.3	307.3	311.0
Hatch (%)	41.0	40.9	40.6

Comparison 2017-19 vs 2020-21 vs 2022-23

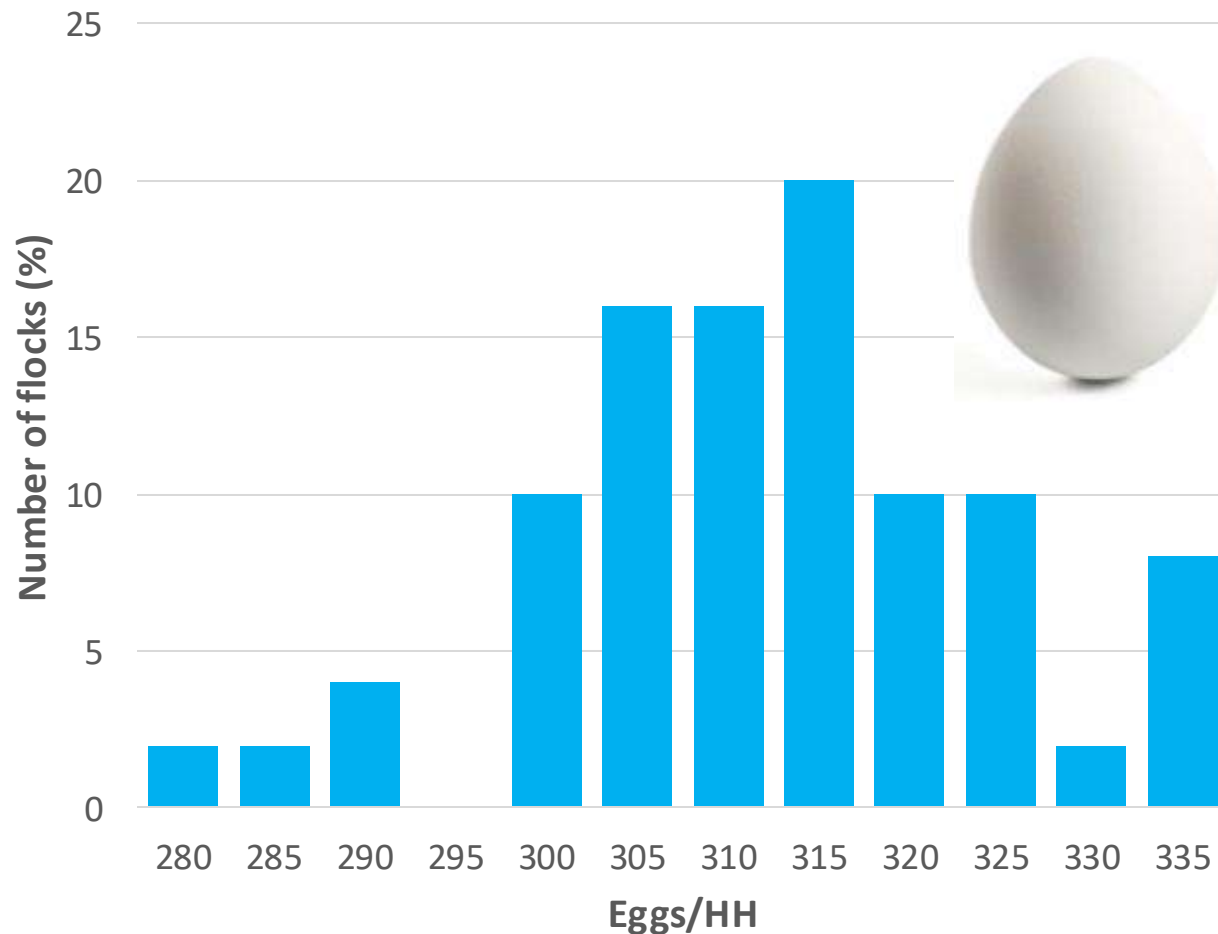
70 weeks	White-PS			Brown-PS		
	17-19	20-21	22-23	17-19	20-21	22-23
N Females (M)	0.46	1.21	1.27	1.26	1.15	1.17
N Flocks	48	96	83	101	94	106
Liv (%)	92.5	93.0	94.6	91.1	92.0	91.0
EN HH	308.3	307.3	311.0	299.7	303.4	304.1
Hatch (%)	41.0	40.9	40.6	39.8	40.9	41.1

Egg Number per Hen-Housed by 70 w



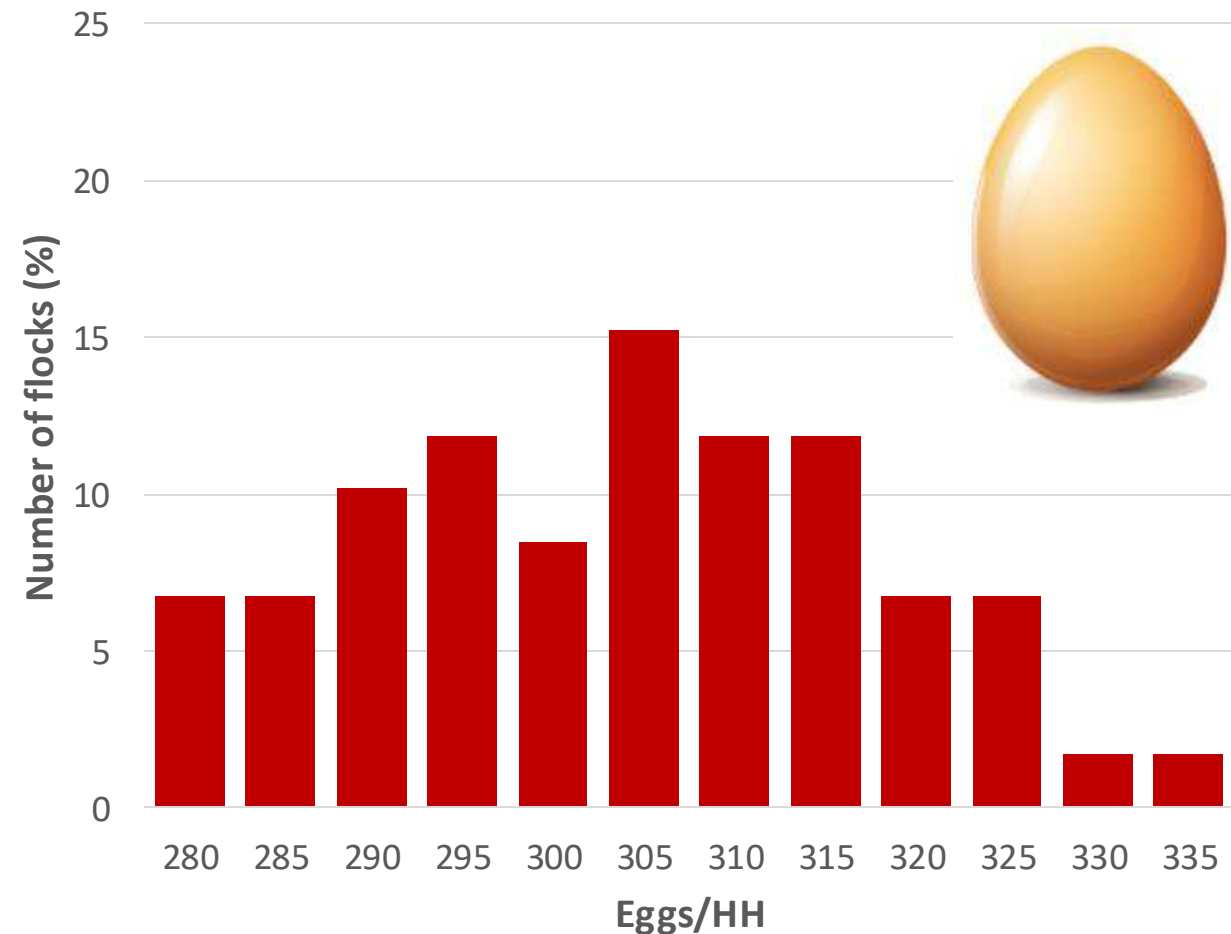
H&N **White** PS

Av.: 311.0
Std.: 302.7



H&N **Brown** PS

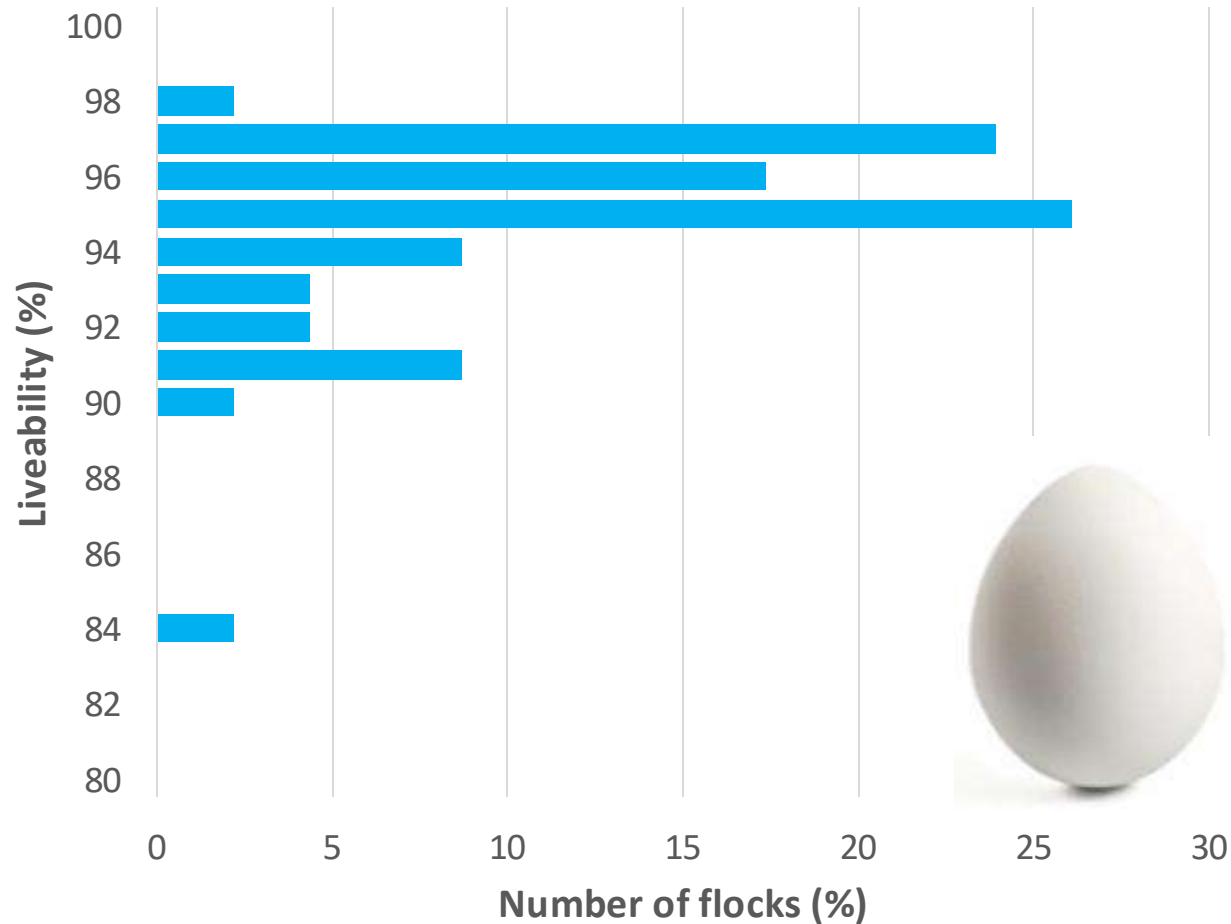
Av.: 304.1
Std.: 295.3



Liveability by 70w

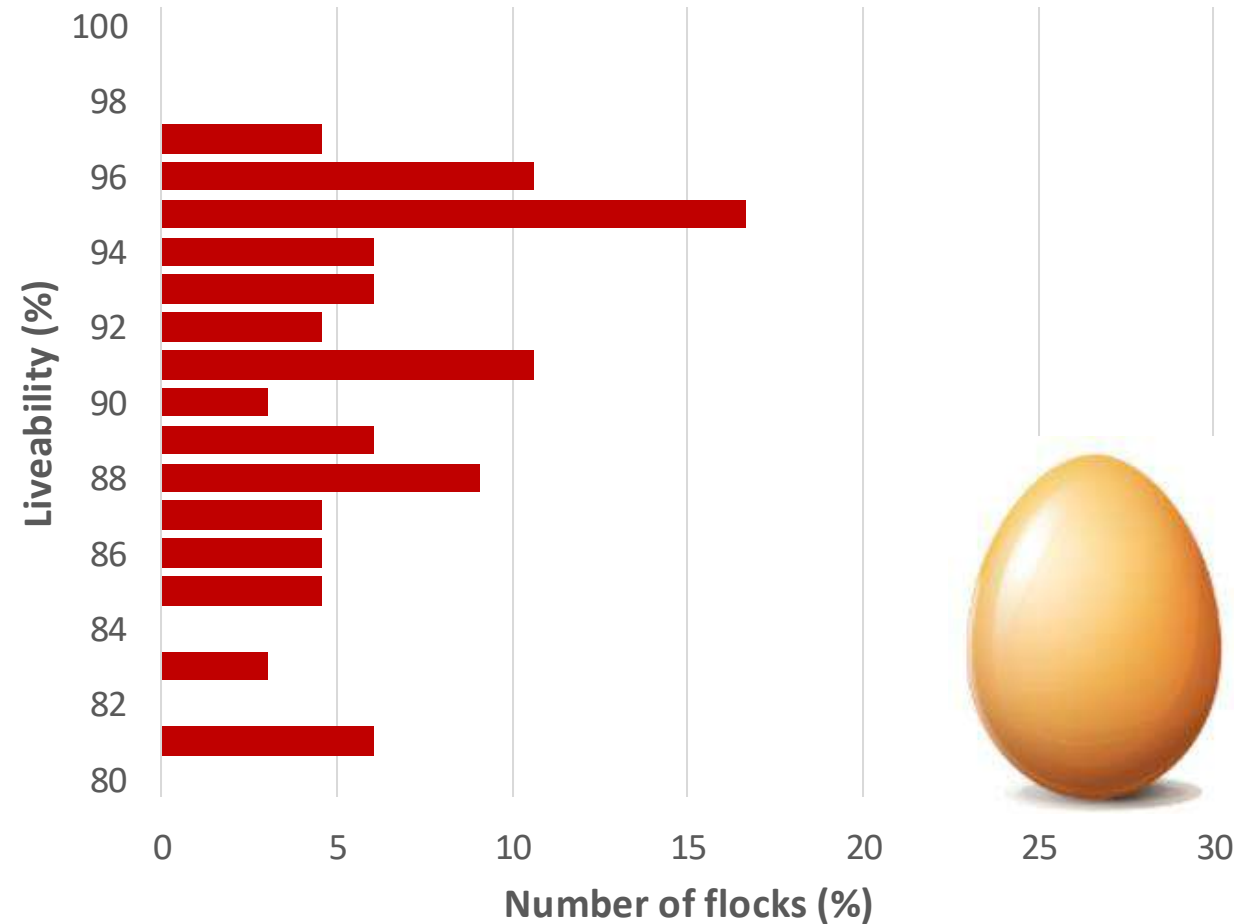
H&N White PS

Av.: 94.6
Std.: 91.7



H&N Brown PS

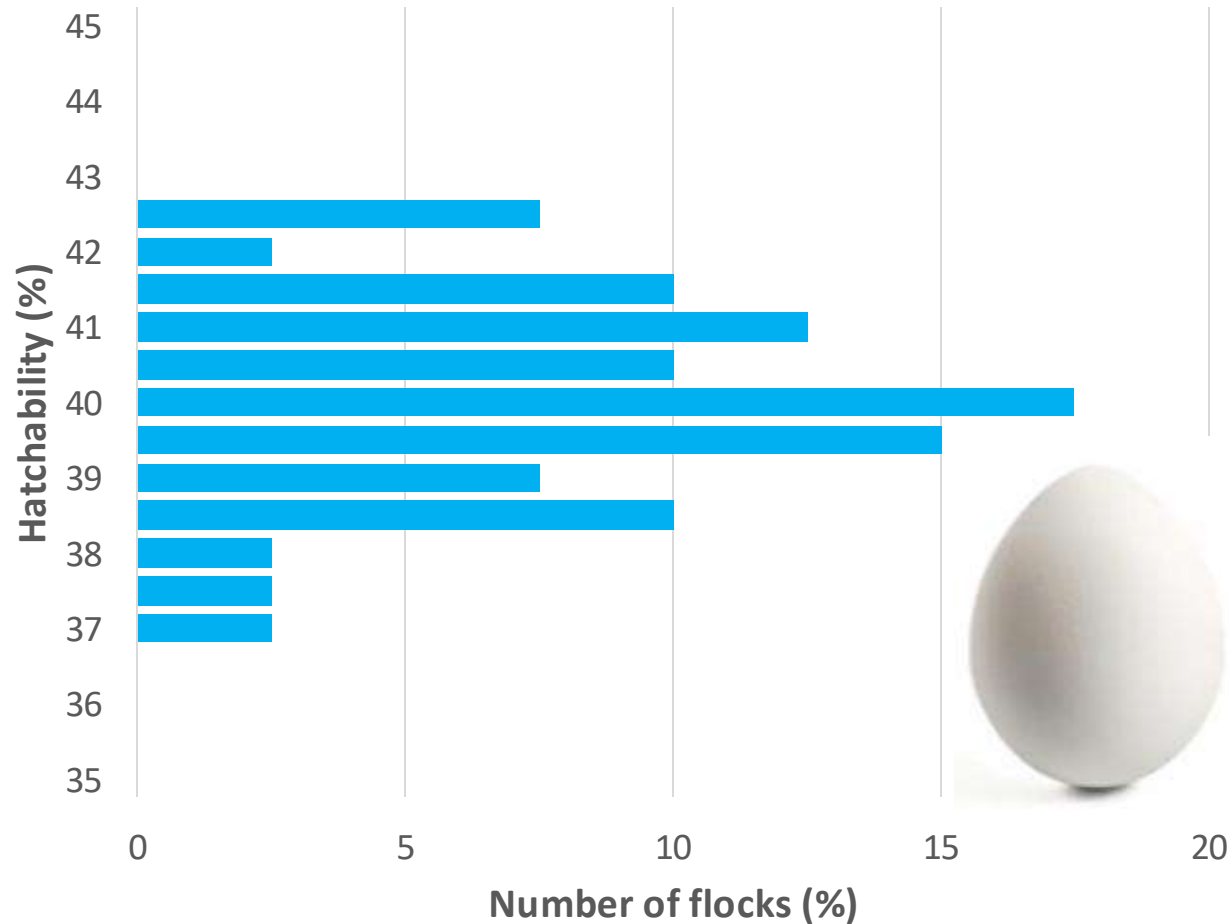
Av.: 91.0
Std.: 91.0



Hatchability by 70 w

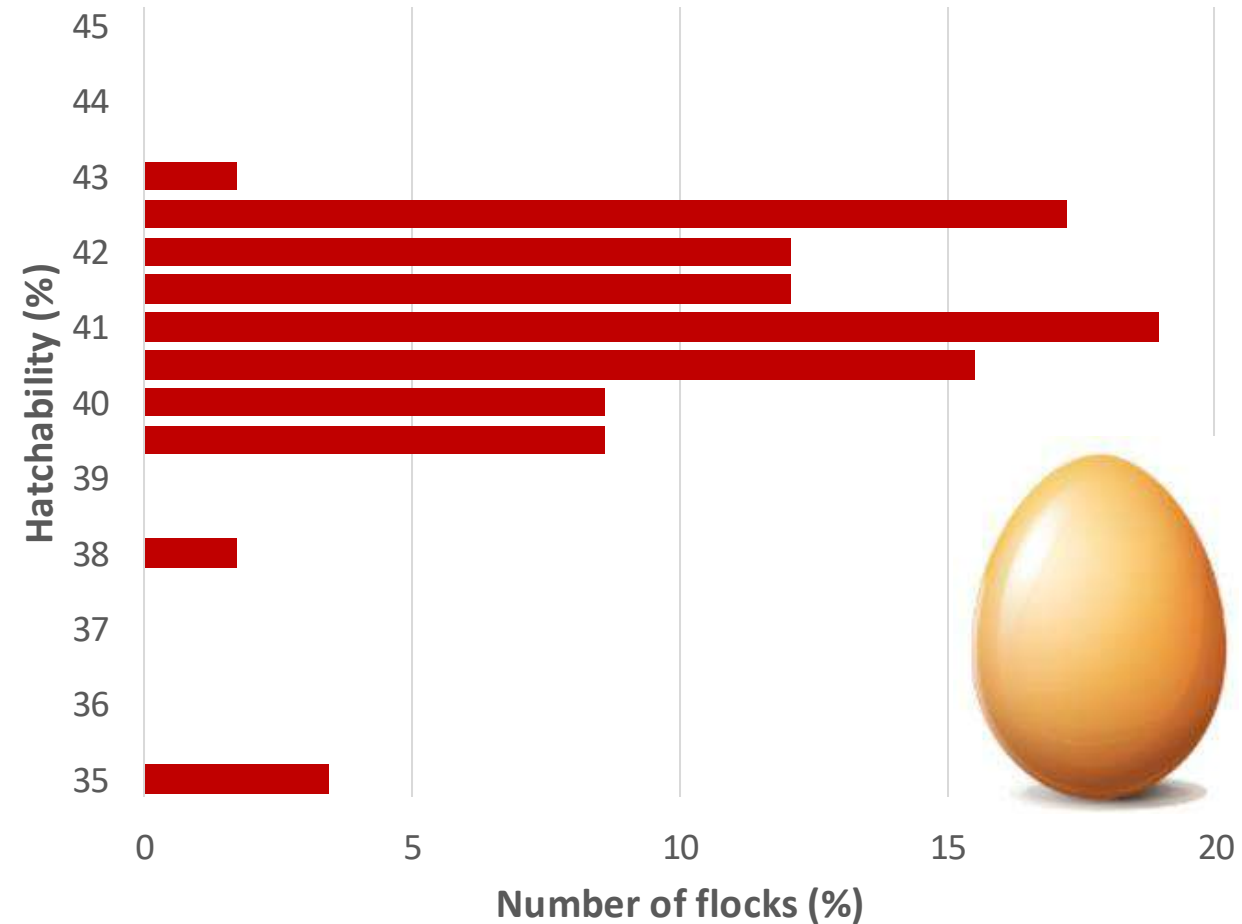
H&N **White** PS

Av.: 40.6
Std.: 41.1



H&N **Brown** PS

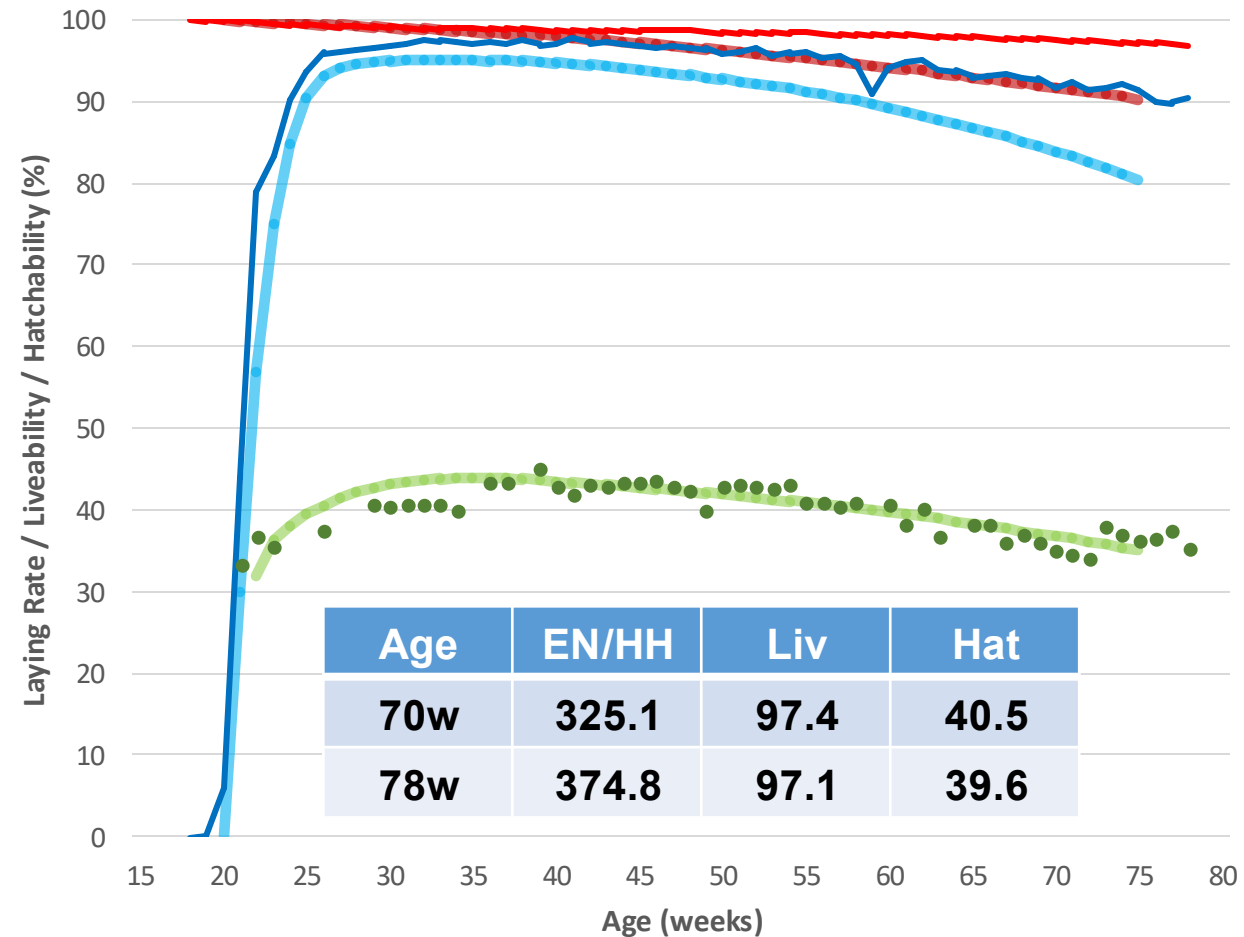
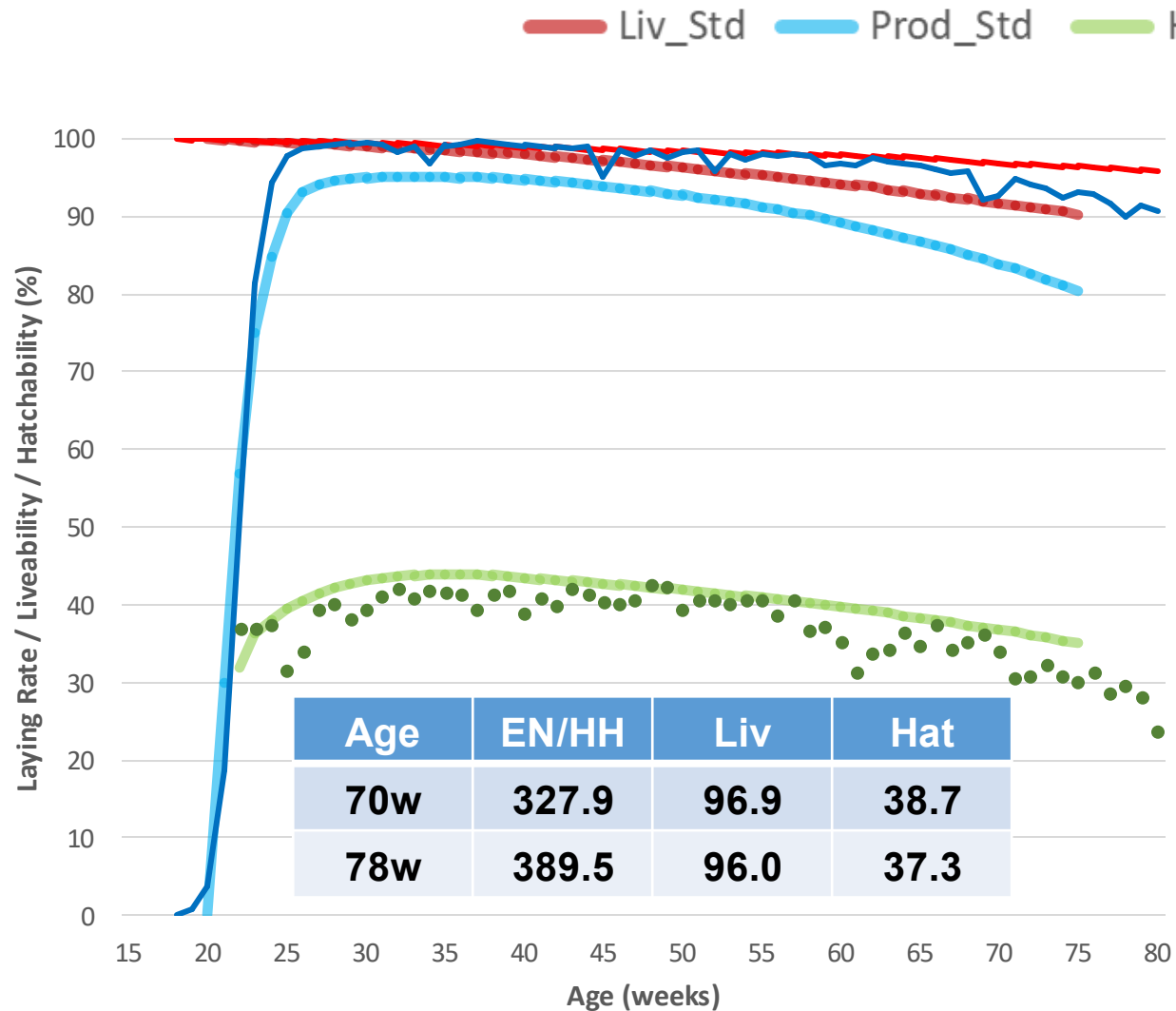
Av.: 41.1
Std.: 40.6



Best White PS-Flocks 2022-23



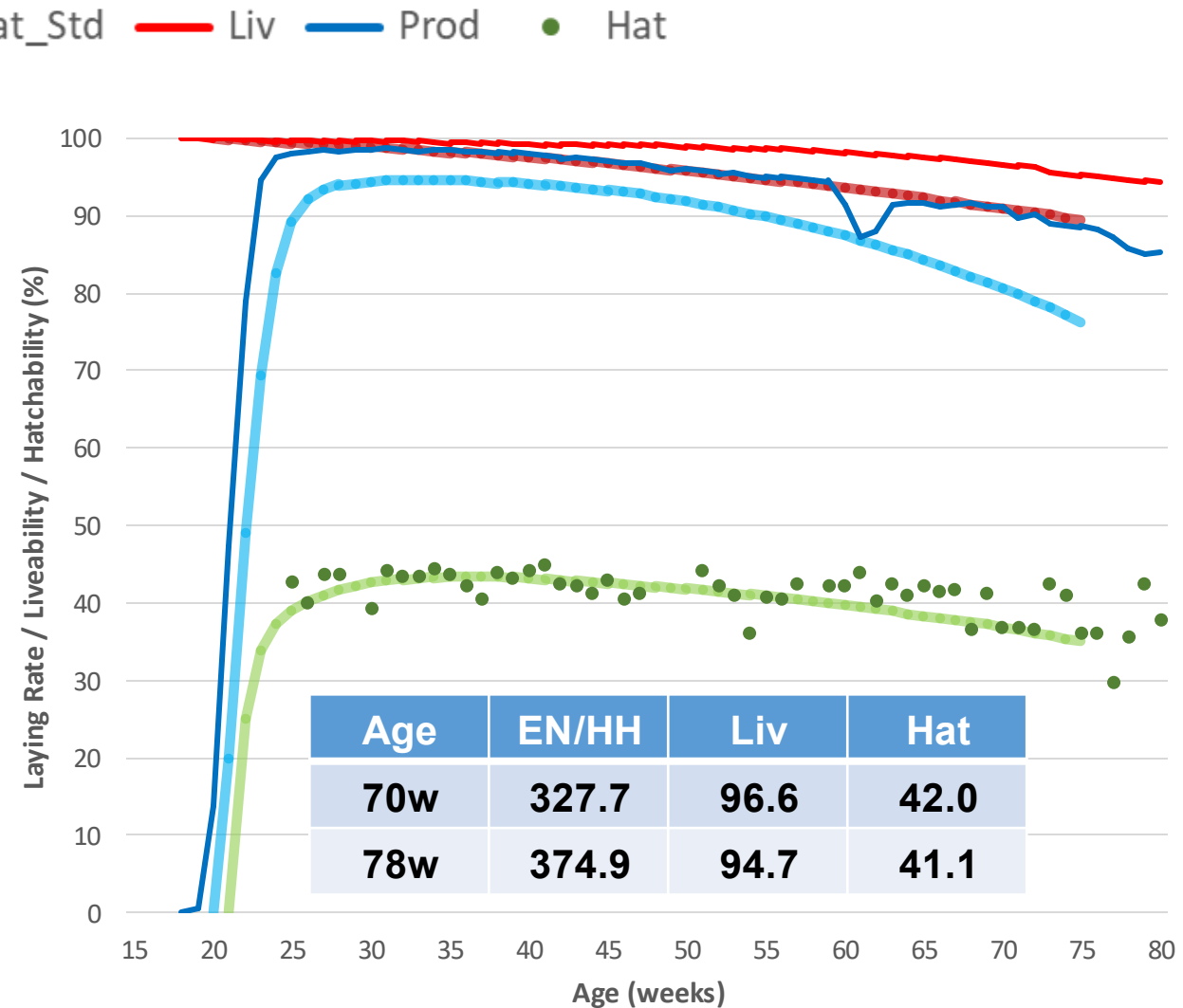
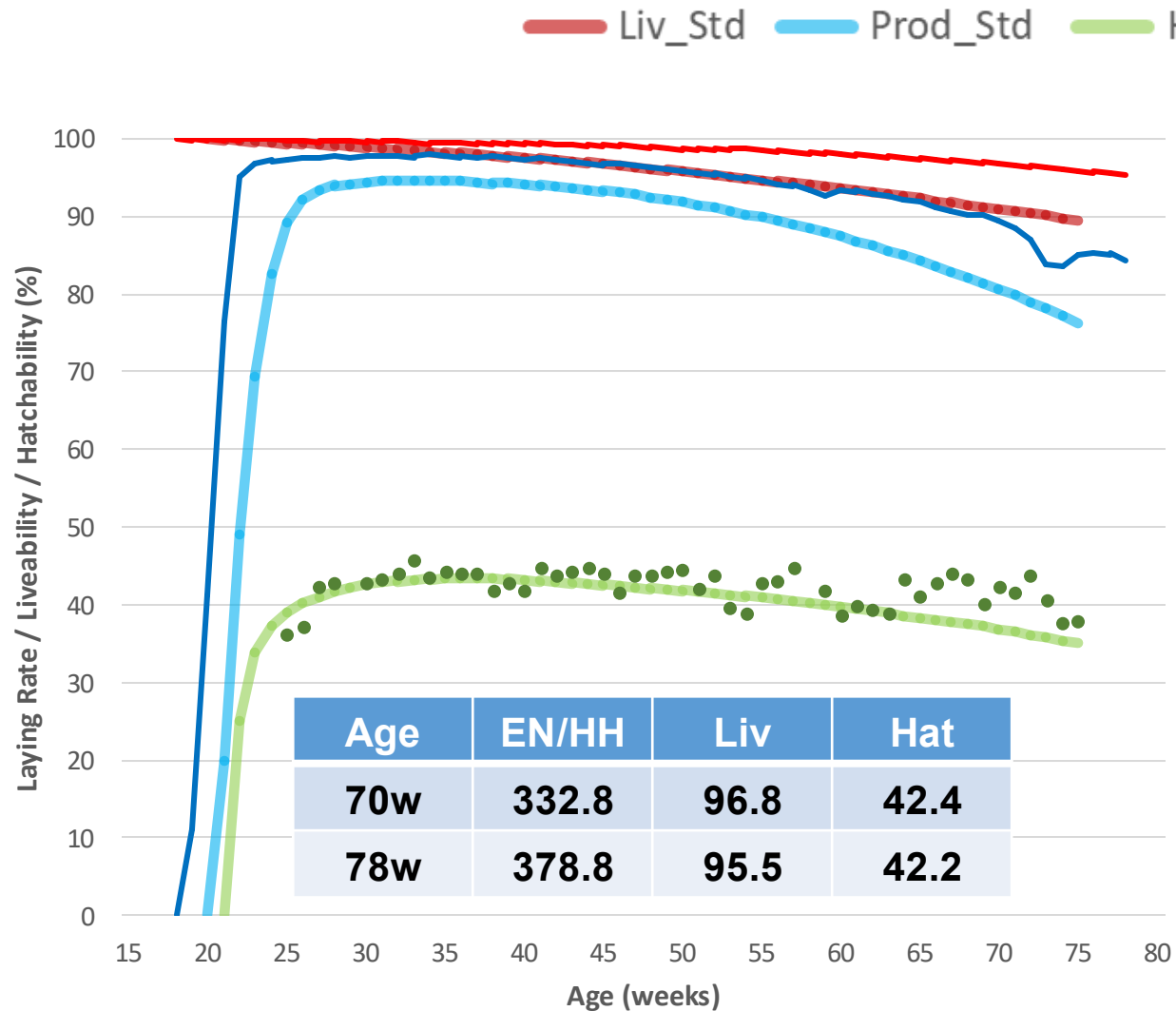
Top PS-White Flocks 2022-2023



Best Brown PS-Flocks 2022- 23



Top PS-Brown Flocks 2022-2023



Future



AI, Please Do My Job

5th H&N
DISTRIBUTOR
CONFERENCE
CAIRO

20th to 24th
OCT
2025

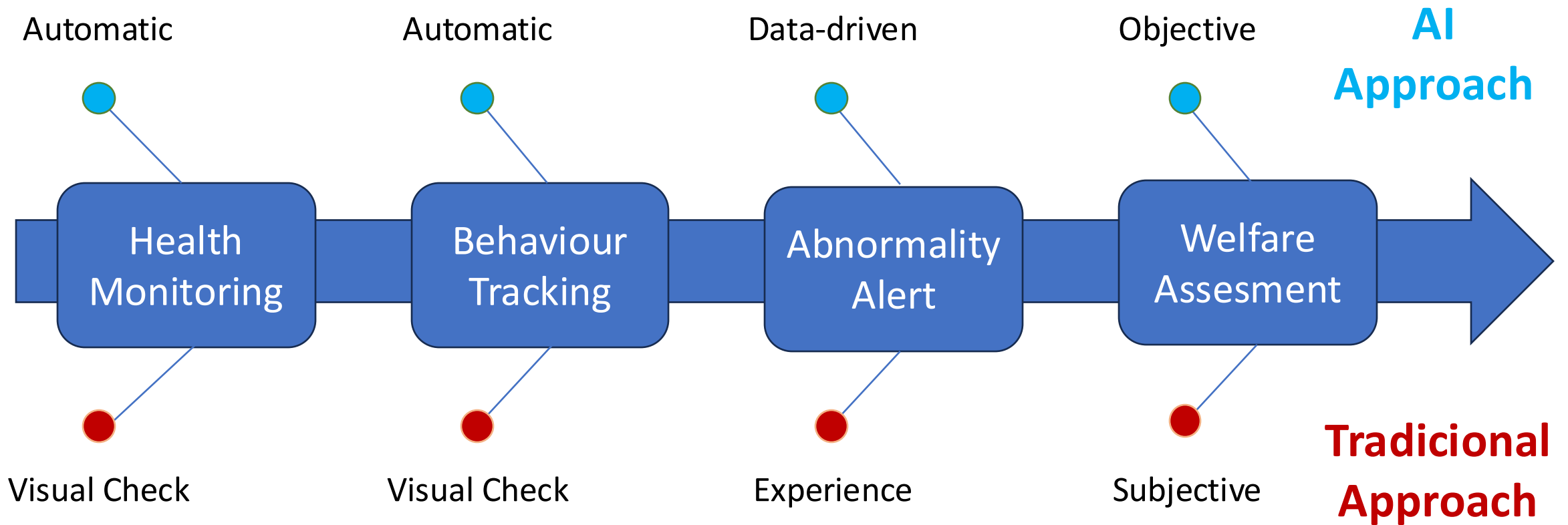


H&N
INTERNATIONAL

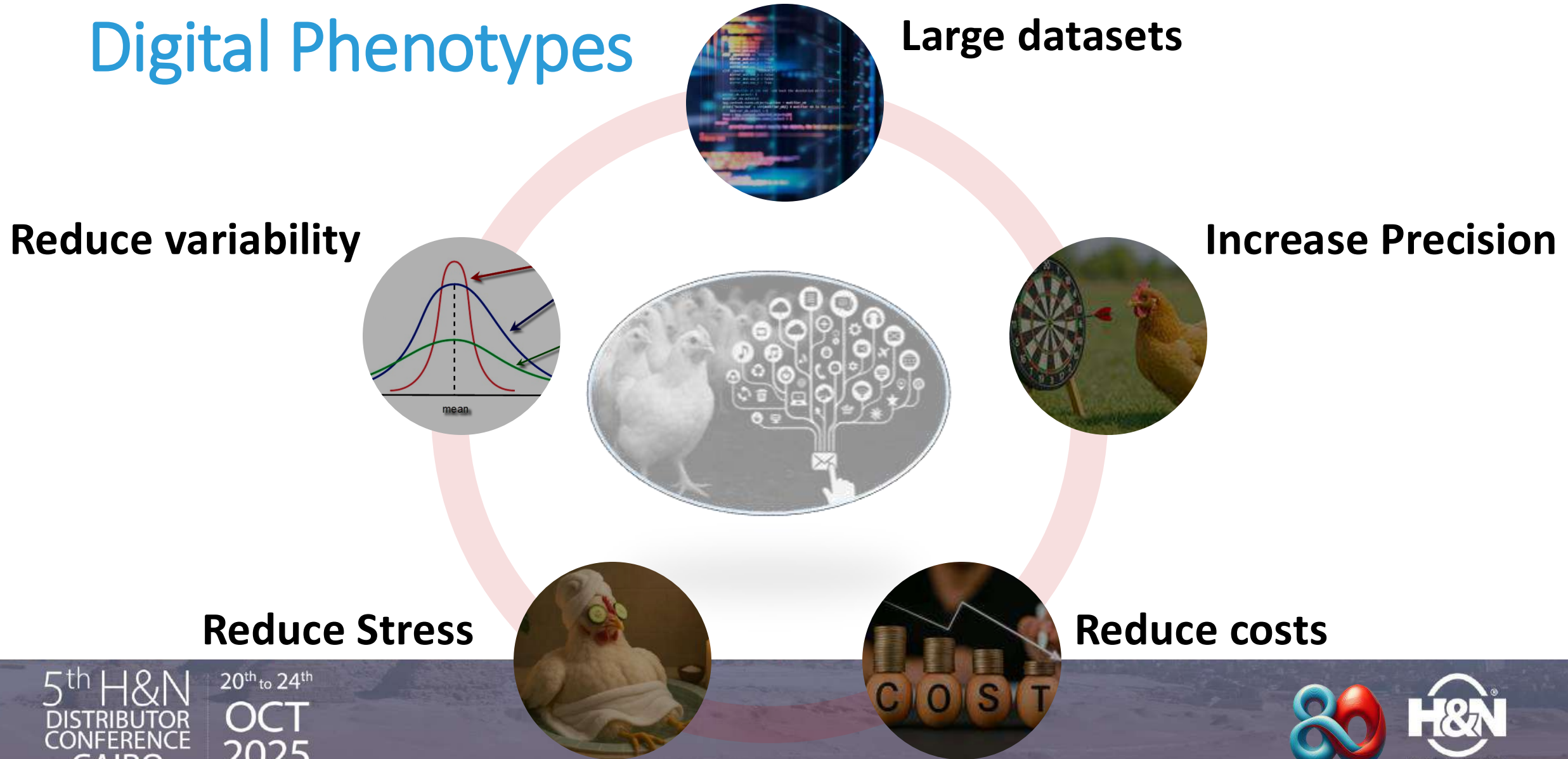
Challenge – Genetic Potential Expression



AI Technologies vs Traditional Approach



Digital Phenotypes

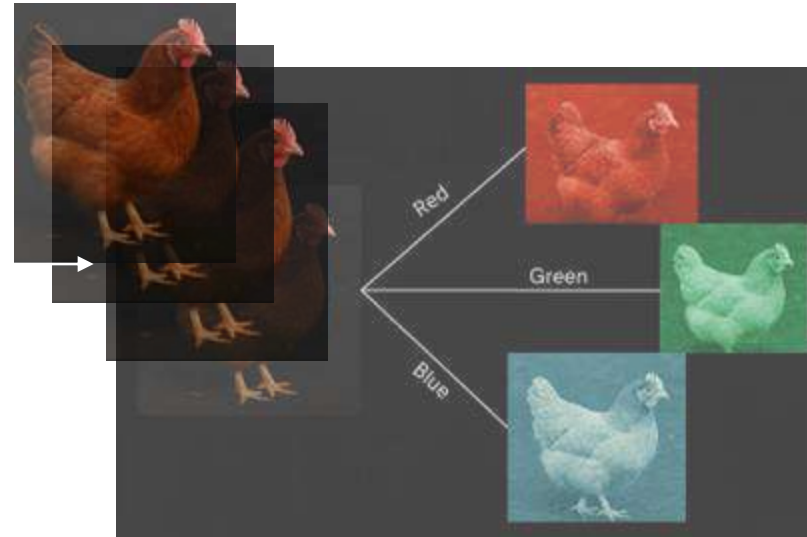


Computer Vision - Workflow

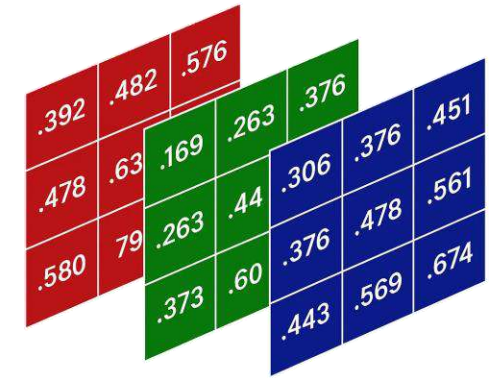
Data Understanding



Dataset Preparation



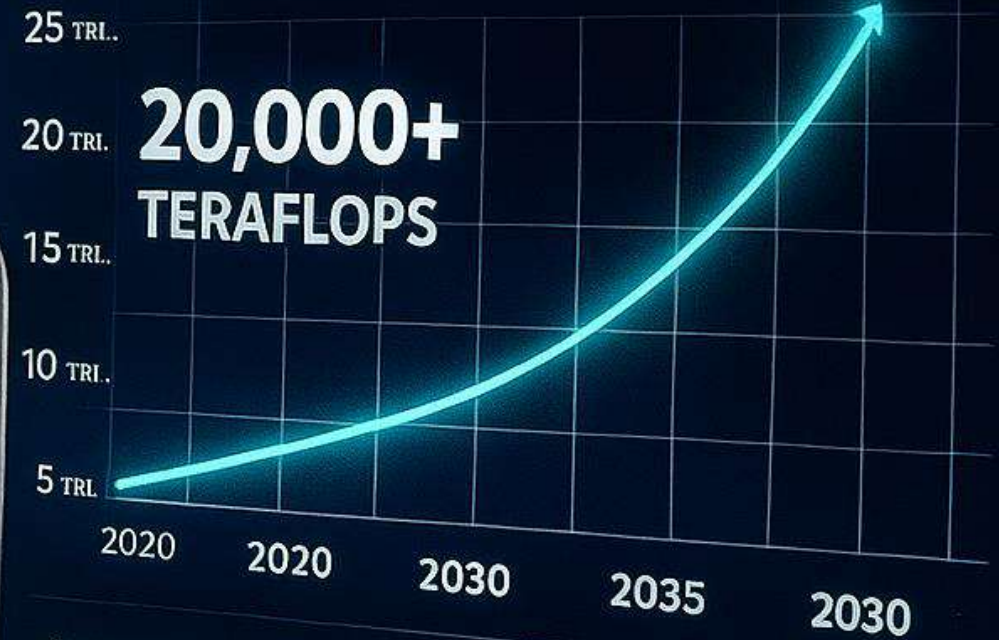
Deep Learning
Models



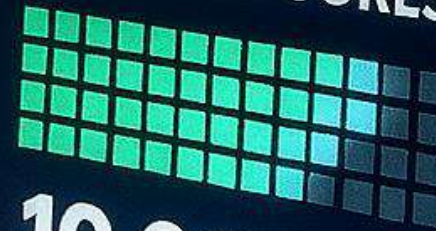
GPUs (Parallel Processing)



CALCULATION POWER



PARALLEL CORES



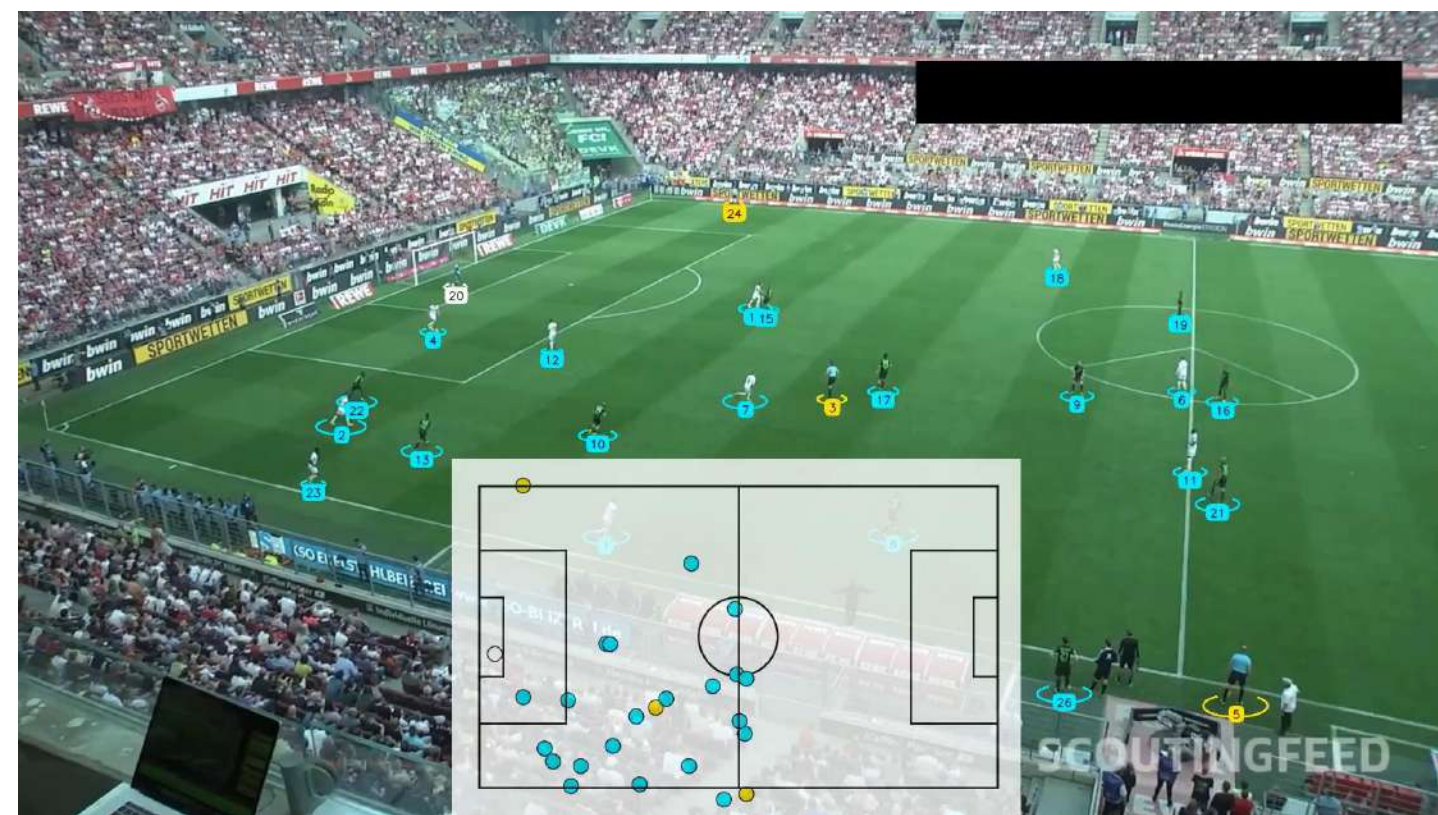
10,000+

THROUGHPUT



200 TERABITS/S

Incorporate technologies from other industries



5th H&N
DISTRIBUTOR
CONFERENCE
CAIRO

20th to 24th
OCT
2025



H&N
INTERNATIONAL

Tracking

Bird Traceability

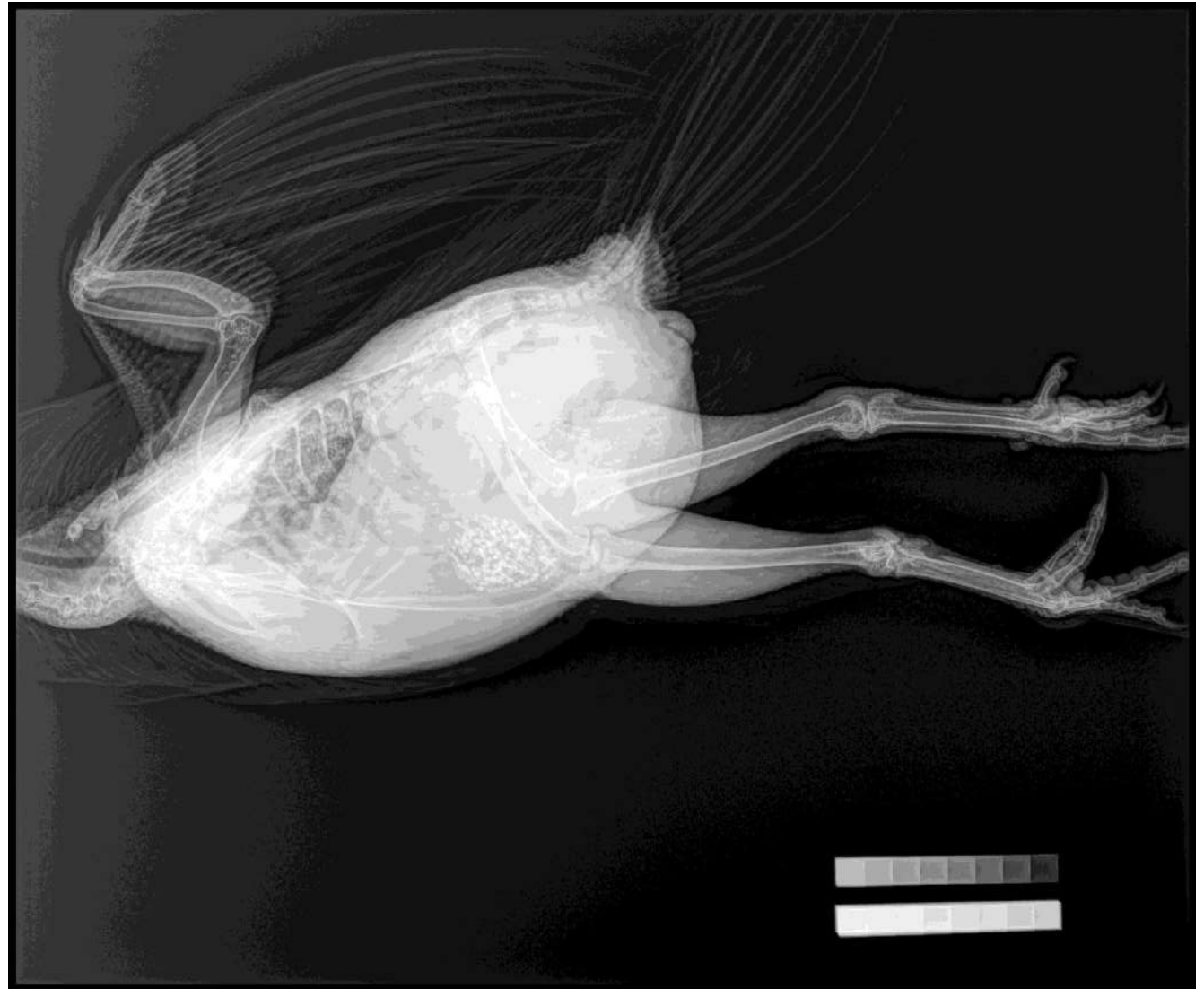


Bone Stability

Based on X-Ray Scanner

AI-Automatic measurement:

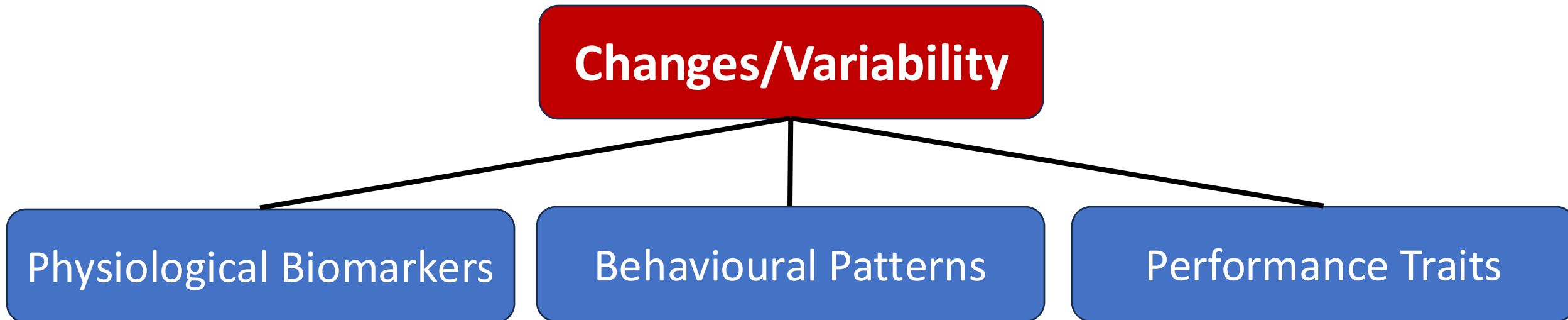
- ✓ Bone Lengths
- ✓ Bone Densities
- ✓ Fractures & Deviations



Resilience Indicators

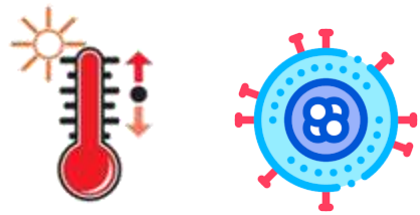
Ability of an animal to maintain or quickly recover its performance after an environmental stress

(Source: Colditz & Hine, 2016)

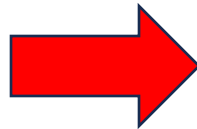


Resilience Indicator

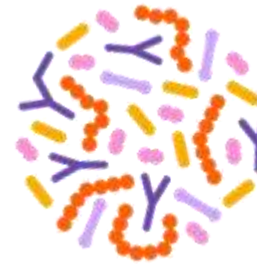
Physiological parameters



Stress



Blood Metabolites



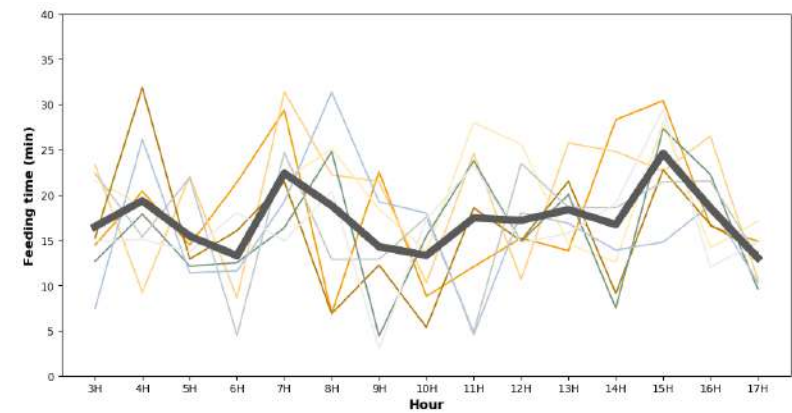
Microbiota



Gene Expression

Resilience Indicator

Individual Behavioural Patterns



5th H&N
DISTRIBUTOR
CONFERENCE
CAIRO

20th to 24th
OCT
2025



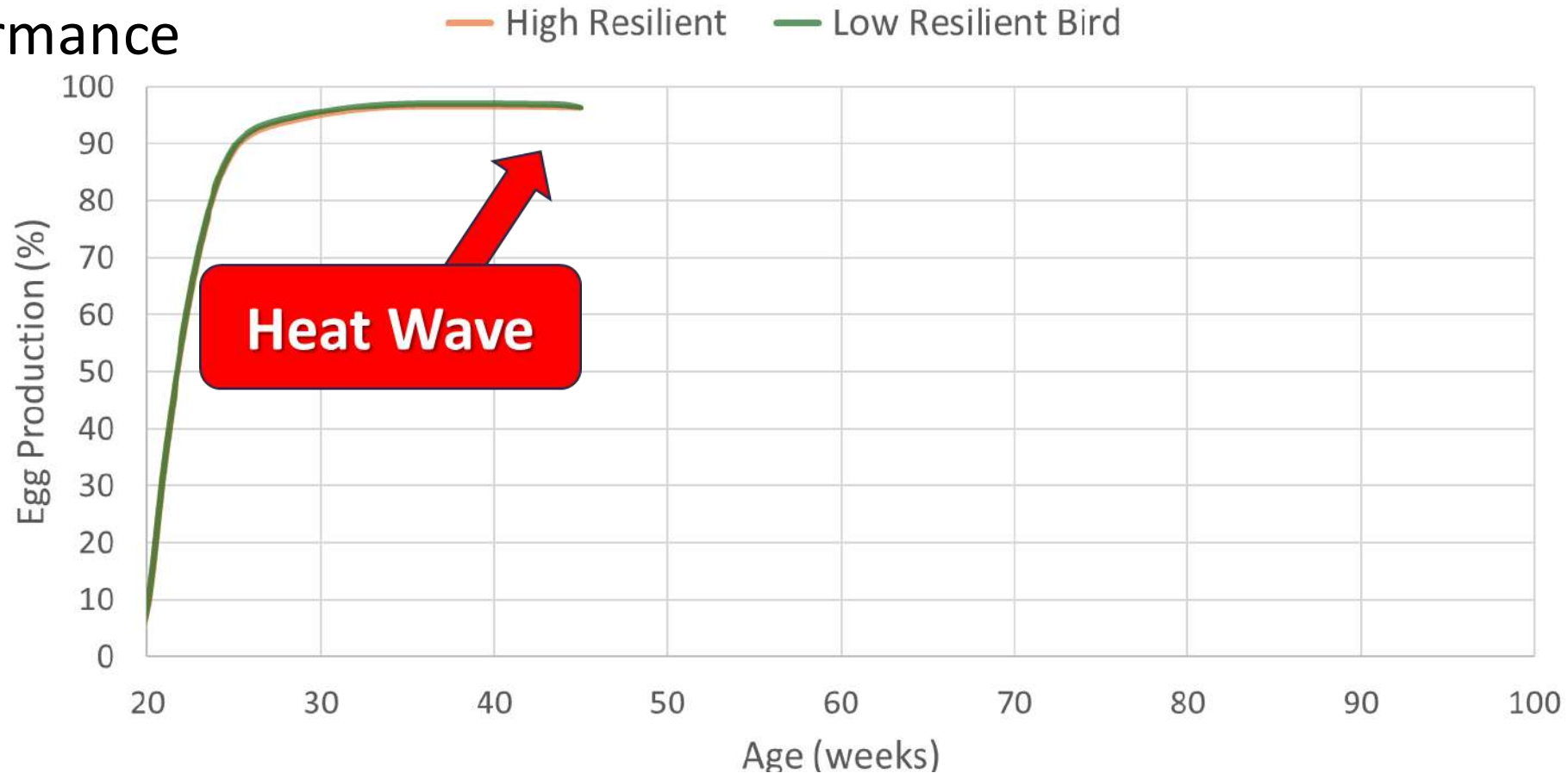
Resilience Indicator

Behavioural Patterns



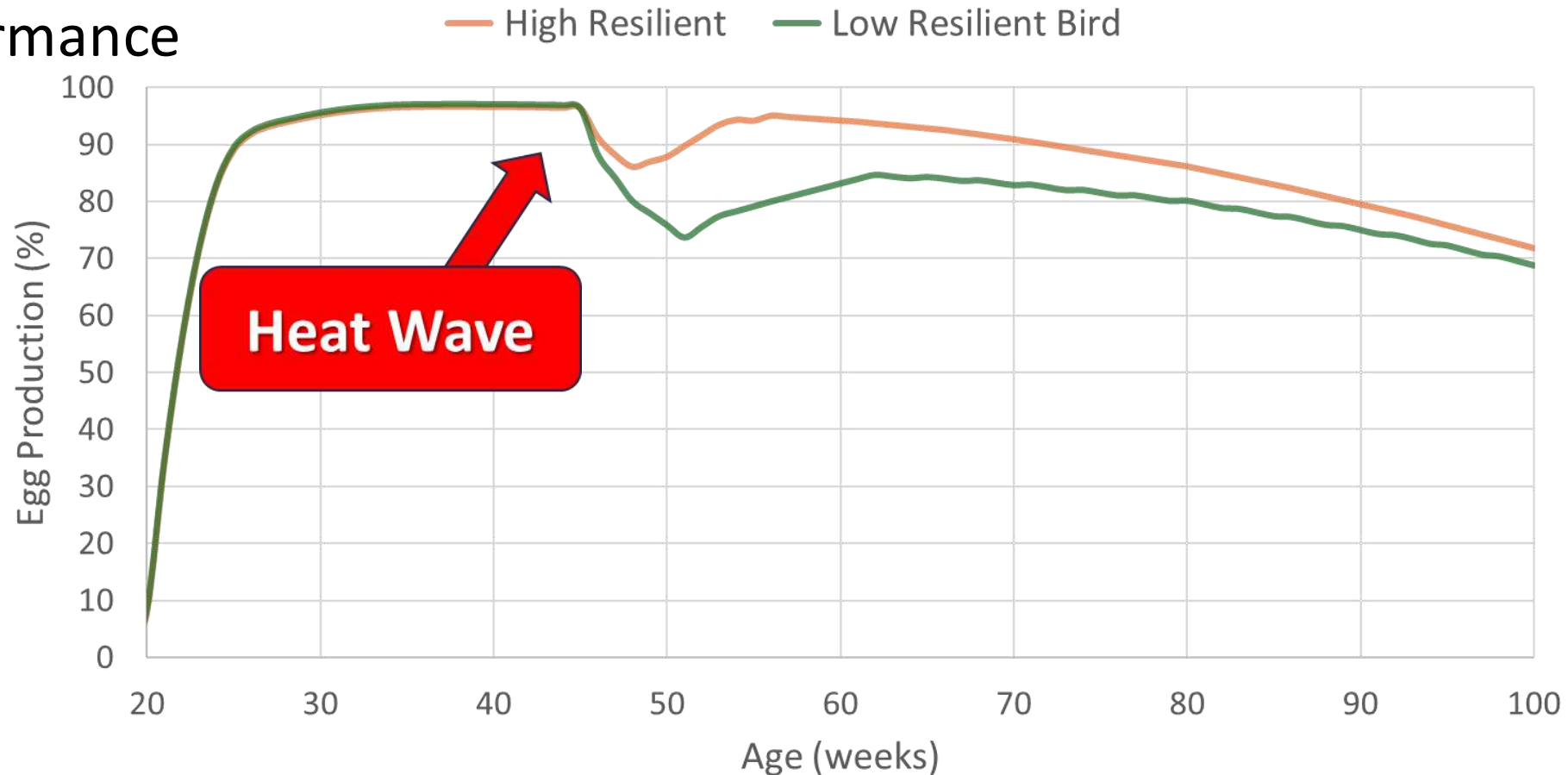
Resilience Indicator

Performance



Resilience Indicator

Performance



Resilience Indicator

Performance

Posible daily Traits recorded by CV:

- ✓ Egg Number
- ✓ Egg Weight
- ✓ Cracks
- ✓ Faeces Consistency
- ✓ ...



Social Interactions

Behaviour and interactions established in a common environment



New Perspectives of Animal Welfare Traits



Complete individual information on real-time



Challenges in a breeding program...



R&D Budget



Logistics



Talent



Big Data



Holistic Goal

Take home Message – Future Perspectives

- ✓ Massive use of Genomic information
- ✓ Implementation of Automation, Computer Vision and AI technology
- ✓ Use of innovative indicators for resilience & robustness
- ✓ Focus on metabolic health, optimal development in rearing & production
- ✓ Deeper understanding of aging & immunocompetence
- ✓ Lower carbon footprint of egg production

