
PARTNERS IN
PROGRESS

Fixing most common cracks in four pillars of broiler performance

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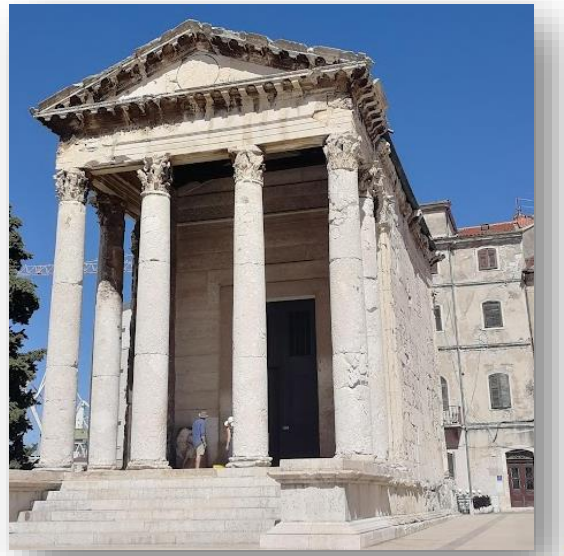
What we will not talk about

- Topic to cover most common issues in achieving optimal broiler results based on European based performances and circumstances.

- Not covering bigger impact of broiler production that it has on environment or any socio-economical aspect of it,

- Nor architecture.

- But we must mention…



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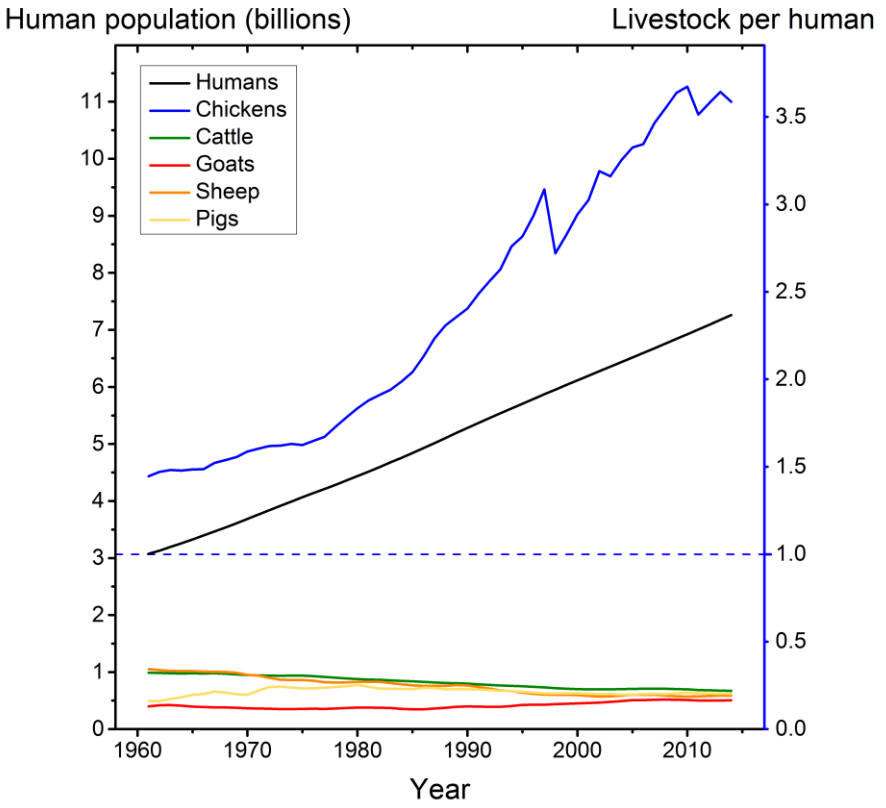
Not talking about 2023 Global PS Market Volumes

(White Feathered Chickens)

Total Global Parent Stock 603.3 Million



North America
99.7 M PS

Latin Ar
113.4

Operations
M PS

Asia
200.8 M PS

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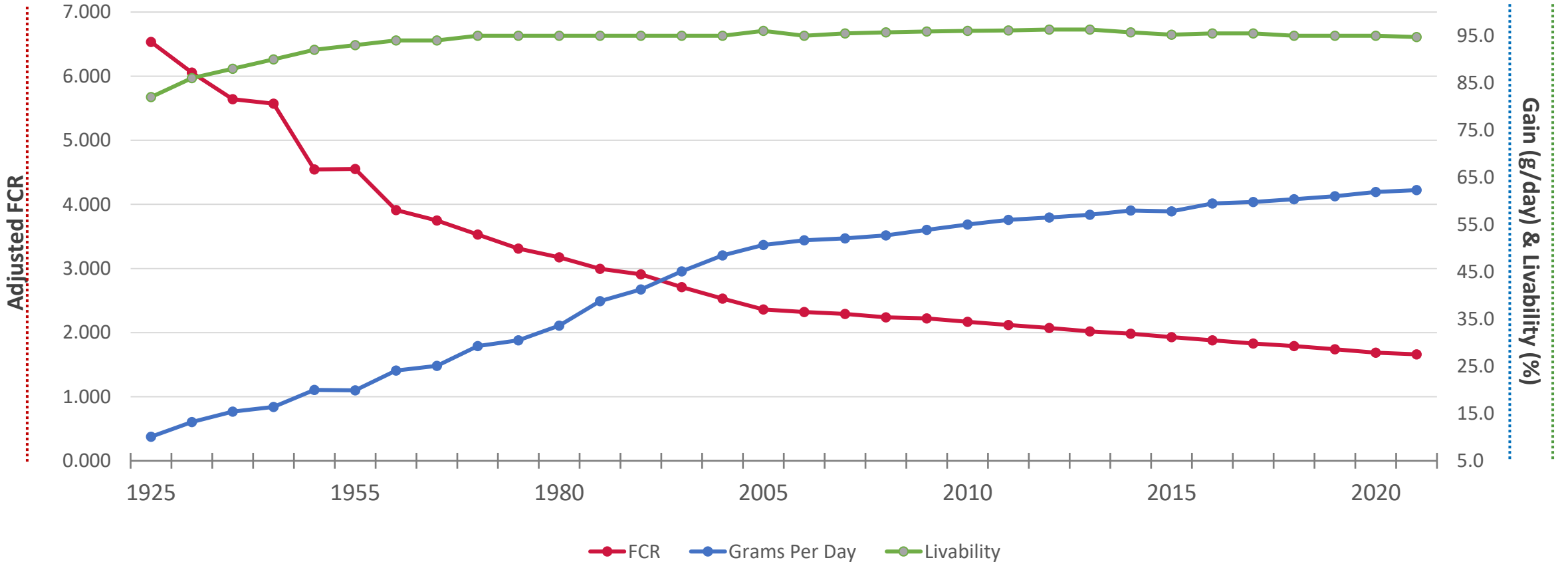
Benefits of Selective Breeding



Improved Growth
Improved FCR
Improved Livability
= More Affordable
More Sustainable
= **Food Security**

Source: National Chicken Council

Translating Genetic Potential into Field Performance

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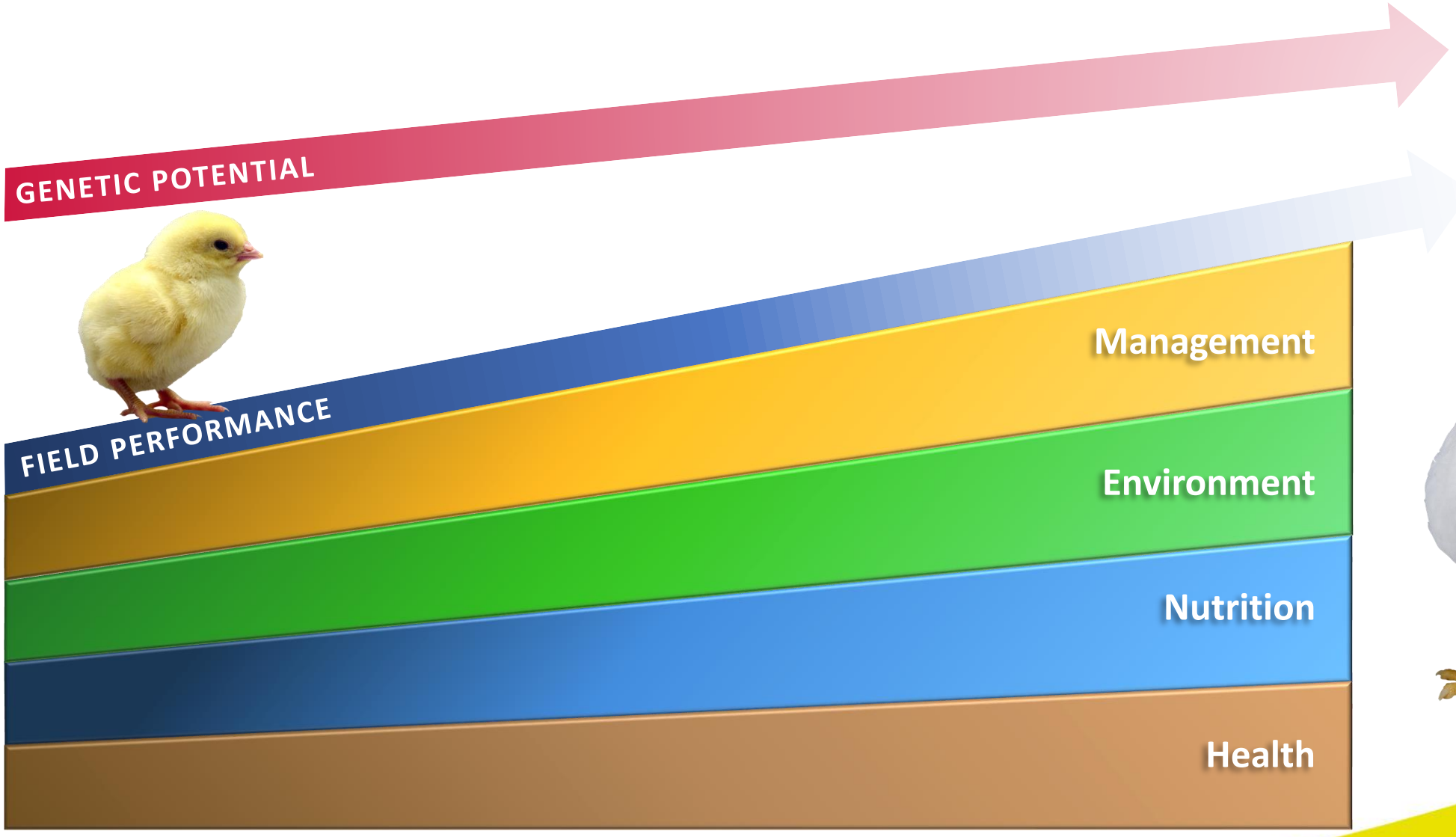

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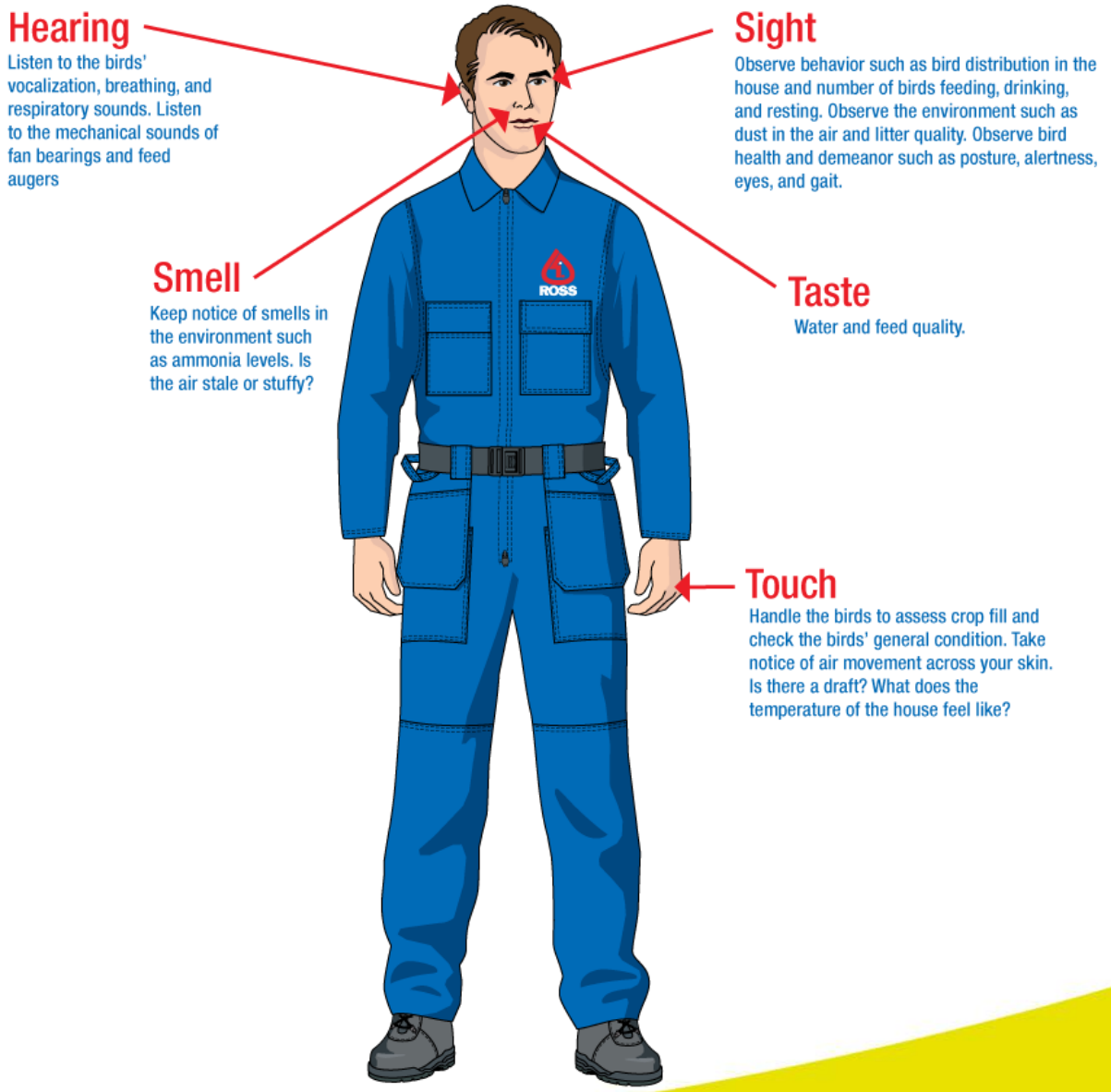
What we will talk about

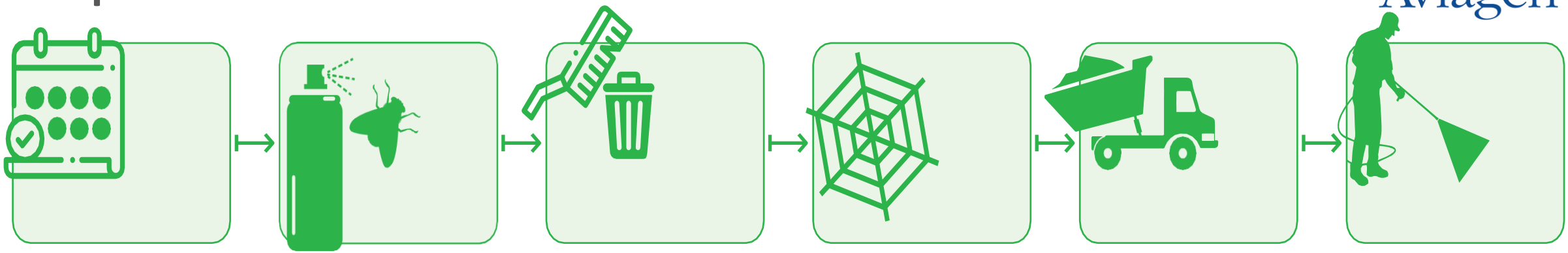
Stockmanship

Use all senses to monitor a flock.



Health – and biosecurity

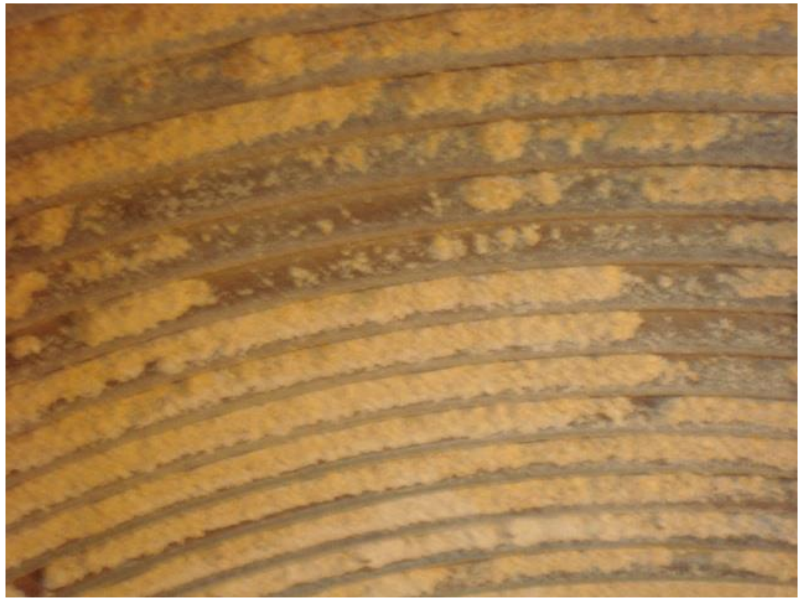
Preparation

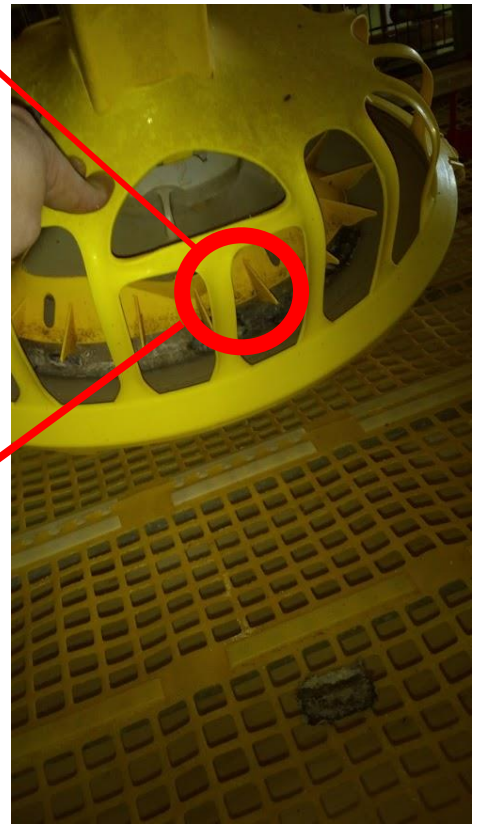


1. Draw up a plan
    - Dates, times, labor, responsibilities and equipment.
2. Insect Control
    - Spray house interior and all equipment immediately after birds have been removed
3. Dry clean equipment
    - Dry brush and remove equipment.
    - Empty feeders and hoppers onto litter; brush out feed bins.
4. Remove dust from house
5. Remove litter
    - Dispose of, at least 3.2 km (2 miles) from the farm, in accordance with local regulations.
6. Pre-spray to remove organic material.
    - Spray house interior and equipment using a low-pressure washer.

Insekticide while the house is still “warm”

Brushing





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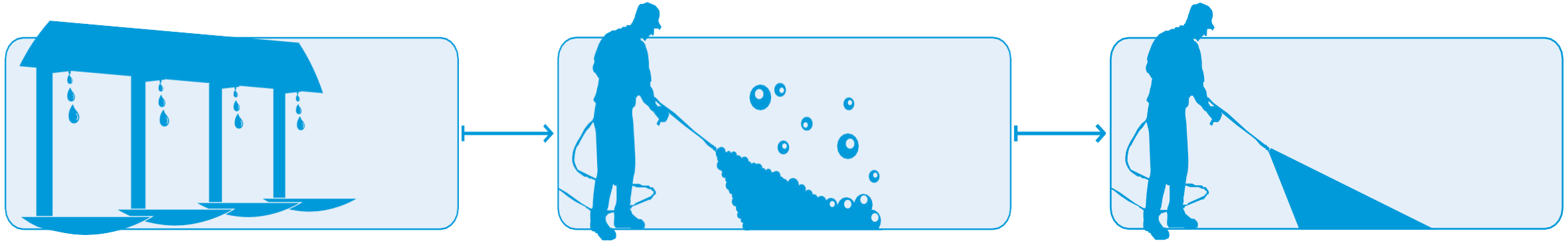
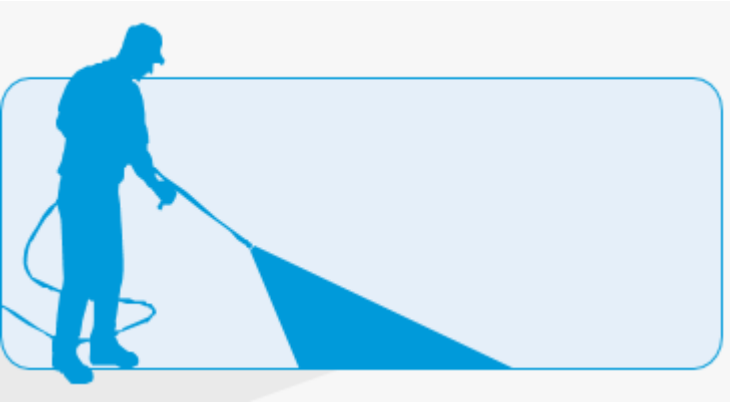
Cleaning



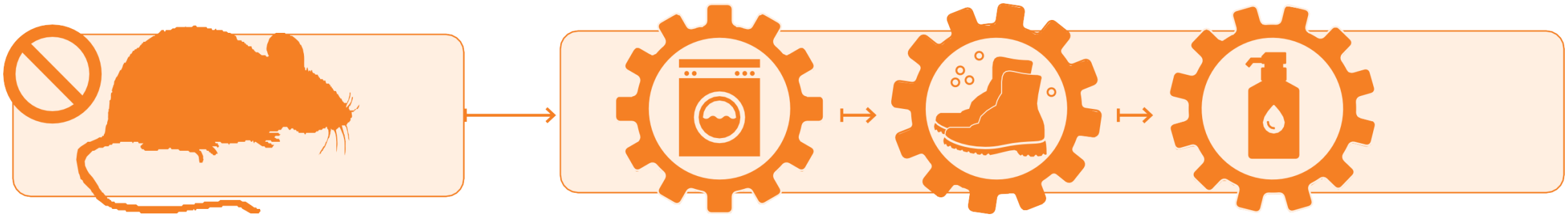
1. The water system
    - Drain, wash and disinfect the water system.
2. Washing
    - Wash interior of house and all equipment with a foam detergent compatible with disinfectant to be used.
3. External Areas
    - Wash external building surfaces. Pressure wash external pathways and access routes.
    - Cut grass/vegetation around house.
    - Clean all staff facilities and social buildings.



Disinfection

1. Disinfection
    - House interior and all equipment.
2. Fumigation
    - Where permitted!
    - Houses are sealed, and no entry is allowed during fumigation.
3. Evaluation of Cleaning and Disinfection Efficiency
    - No salmonella should be isolated, and bacterial counts must be within acceptable limits.
    - Consult a local veterinarian for an appropriate sampling procedure.

Additional



1. Rodent control
2. Protective clothing and farm hygiene
    - Launder all farm clothing. Wash and disinfect boots.
    - Refresh footbaths and hand sanitizers.

Rodents – from economic losses to disease vectors

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Clear demarcation of dirty and clean area

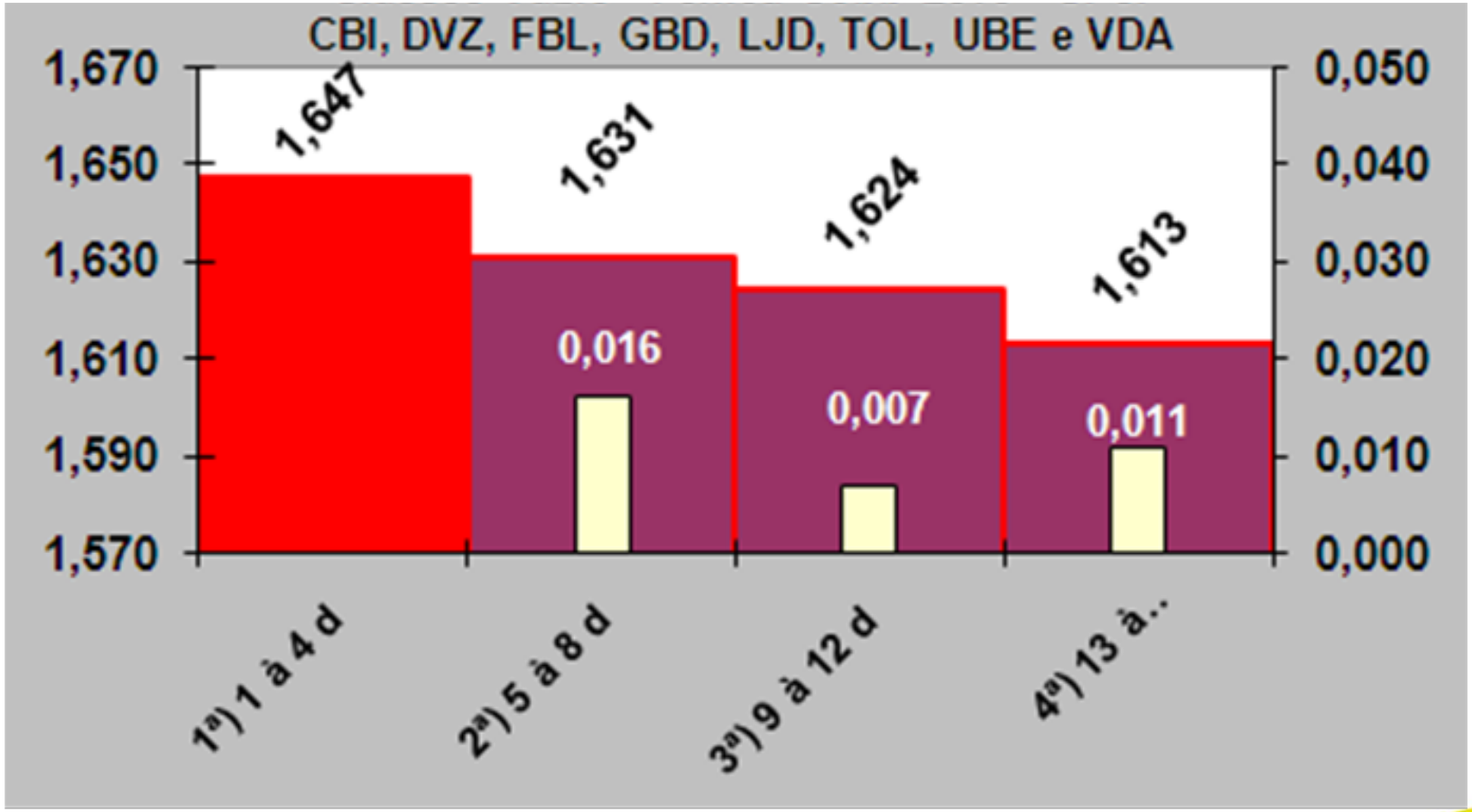
House resting....not necessarily farmer's ☺

- Organizing placement
- Preparation of the litter material…feed…energy

- How long?
  - 10-14 days
  - Balance between biology and economy...

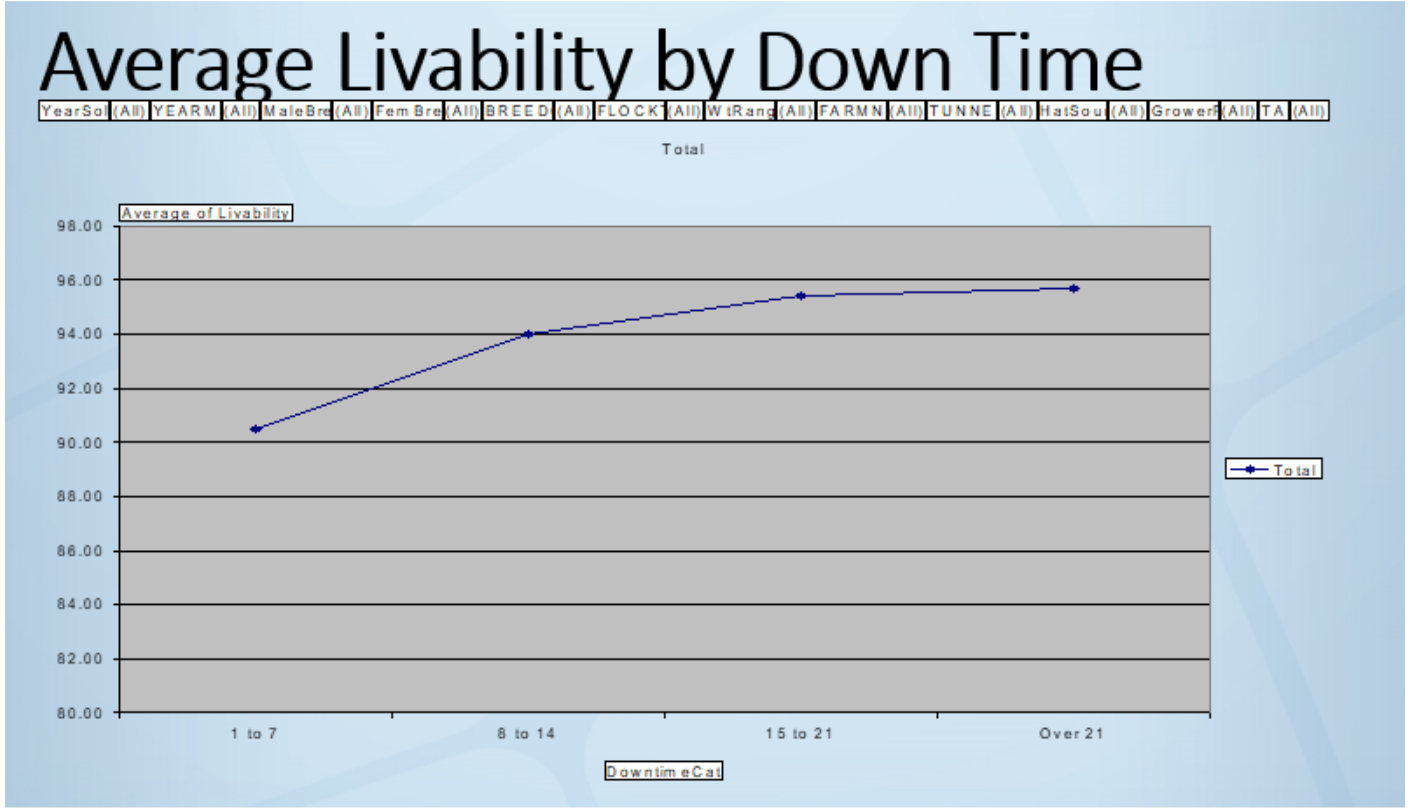
Downtime and FCR

Difference between downtime of 1-4 days and 13-20 days:
34 points FCR



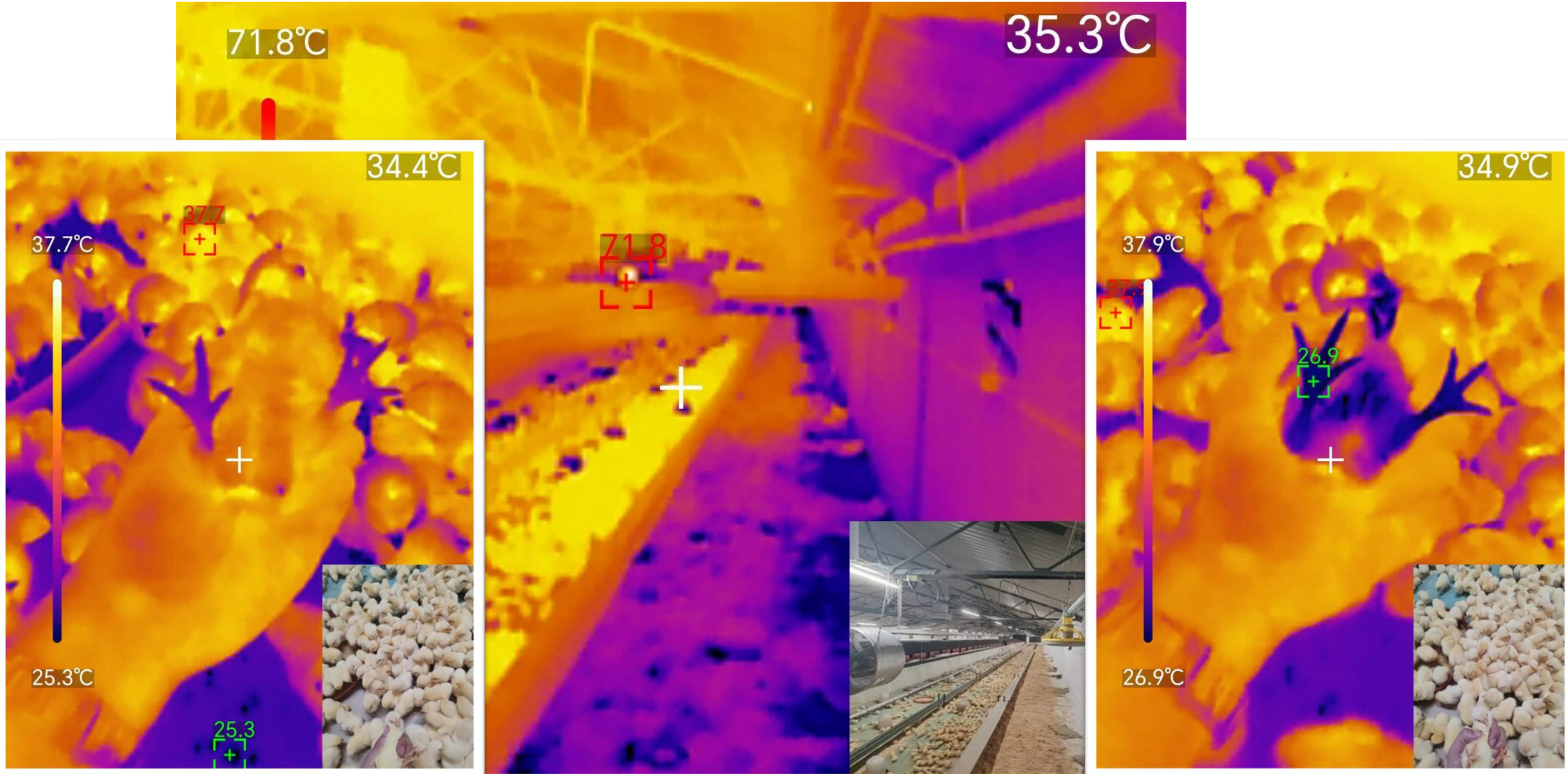
Downtime and livability

Difference between downtime of 1-7 days and >20 days → higher livability



Management – chicks’ start

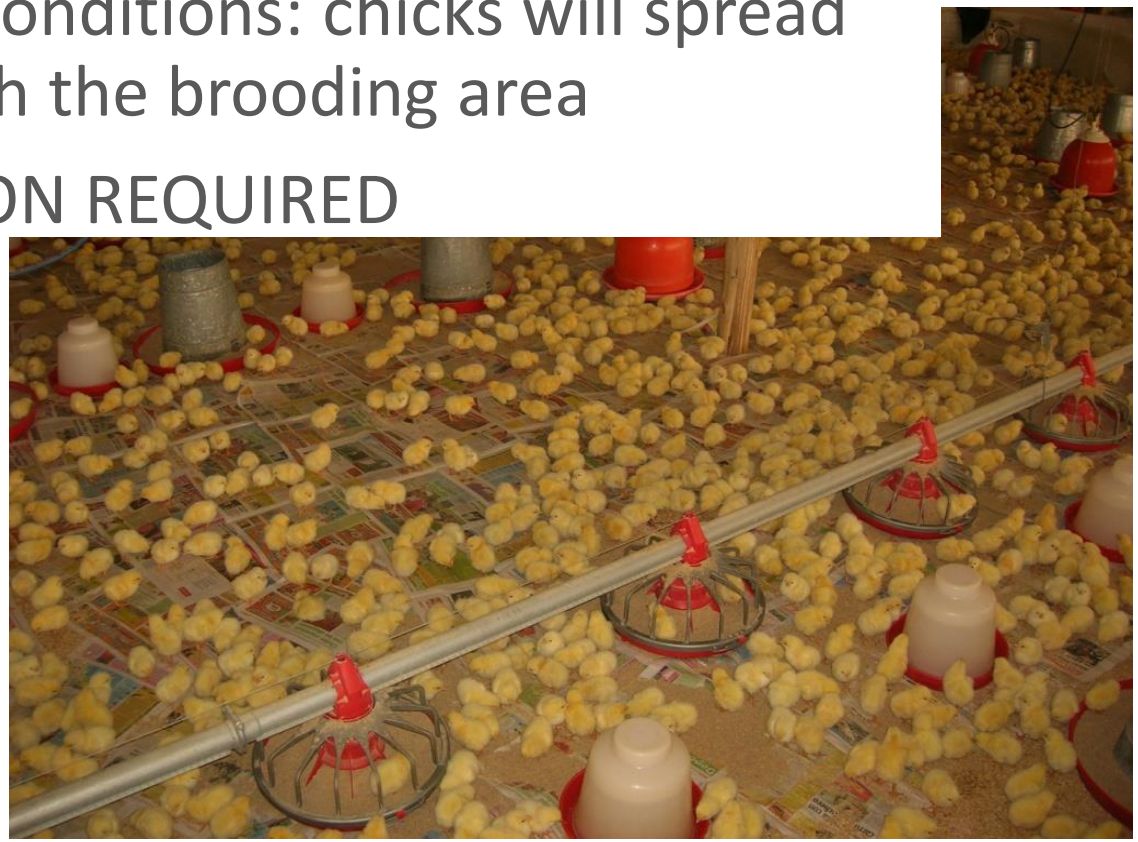
Brooding – floor temperature



Chick Behaviour

Correct environmental conditions: chicks will spread evenly through the brooding area

NO ACTION REQUIRED



Chick Behaviour

Environmental conditions are too cold: chicks group together under heaters or within the brooding area

INCREASE TEMPERATURE AND/OR RELATIVE HUMIDITY

Chick Behaviour

Environmental conditions are too hot; chicks are crowded near the house walls or brooding surrounds away from the heat source or they are panting

DECREASE TEMPERATURE AND/OR RELATIVE HUMIDITY

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Chick Vent Temperature

- The ideal chick vent temperature for the first 4-5 days after hatch is **39.4-40.8°C (103-105°F)**

Procedure

1. Measure vent temperature on at least 5 chicks from at least 3 different locations.
2. Gently pick the chick up and hold it so that the vent is exposed, put the tip of the Thermoscan® onto the bare skin and record the temperature.
3. Do not take the vent temperature of chicks with wet or dirty vents .

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Chick Start Assessment

Collect 30-40 chicks from 3-4 different places in the house

Full, soft, and rounded crop; feed and water found

Empty crop

Time of Crop Fill Check After Placement	Target Crop Fill (% of Chicks With Full Crops)
2 hours	75
4 hours	80
8 hours	>80
12 hours	>85
24 hours	>95
48 hours	100

Management Fundamental

- If target crop fill is not achieved, take action

Nutrition – and balanced protein

Balanced amino acid profile - what is it?

Essential amino acid ratios to Lysine

Age Fed	days	0-10		11-24		25 -39		40-51	
Digestible amino acids		2019	2022	2019	2022	2019	2022	2019	2022
Lysine	%	100		100		100		100	
Methionine + Cyst(e)ine	%	74	76	76	78	78	80	78	80
Methionine	%	40	42	41	43	42	44	42	44
Threonine	%	67	67	67	67	67	67	67	67
Valine	%	75	76	76	77	76	78	78	78
Isoleucine	%	67	67	68	68	69	69	69	69
Arginine	%	107	106	107	108	107	108	108	110
Tryptophan	%	16	16	16	16	16	16	16	16
Leucine	%	110	110	110	110	110	110	111	110

Skin, feathers, breast yield

AA antagonism, FCR, breast yield

Growth rate, immunity, yield

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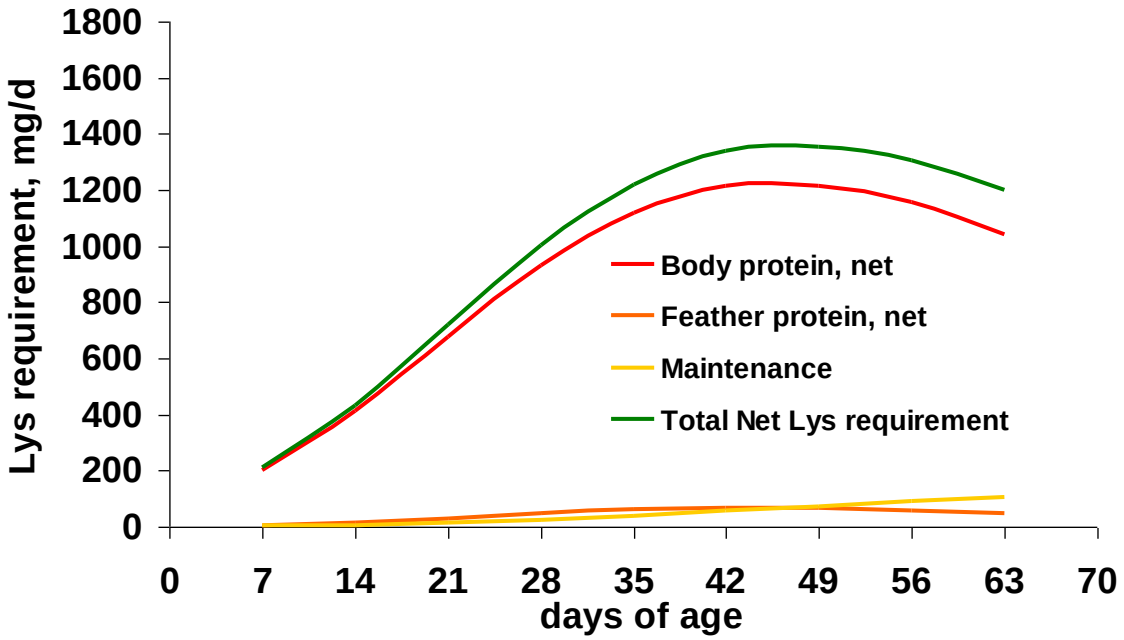
Why is Lysine the reference amino acid in balanced protein?



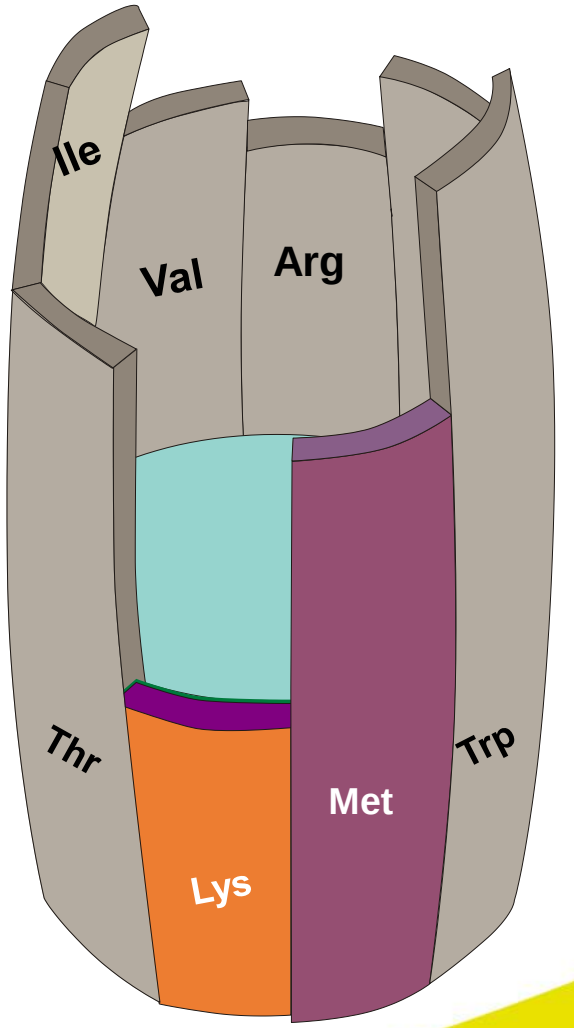
1. Lysine does not take part in other functions of the body:
   - Used virtually exclusively in production (accretion) of body protein (meat) = limiting amino acid for muscle production
   - Virtually no content in feathers and
   - Virtually no maintenance needs
2. It is relatively easy to analyze
3. Because swine nutritionists were already doing it ☺

Practical application of the balanced protein concept

Define the optimal level of digestible Lys

(performance, market, return)

Keep balance of **all** other essential AA in relation to Lys



NOTE:

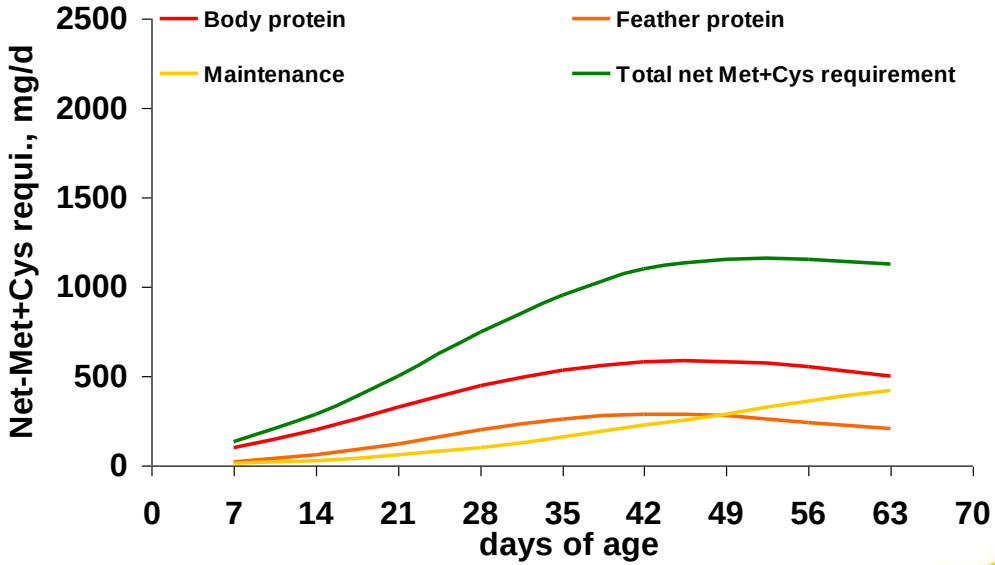
Crude protein levels in recommendations are for guidance only – if minimum essential amino acid specifications are met, CP levels should align with "recommendations"

And why are other amino acids important?

The importance of Met+Cys throughout the growth period

- Met + Cys are used in several metabolic processes:
  - Feather development
  - Skin and epithelium growth and integrity
  - Immunity
  - Oxidative status
  - Energy metabolism
  - Cell proliferation
  - Body protein (muscle) growth

  (…)



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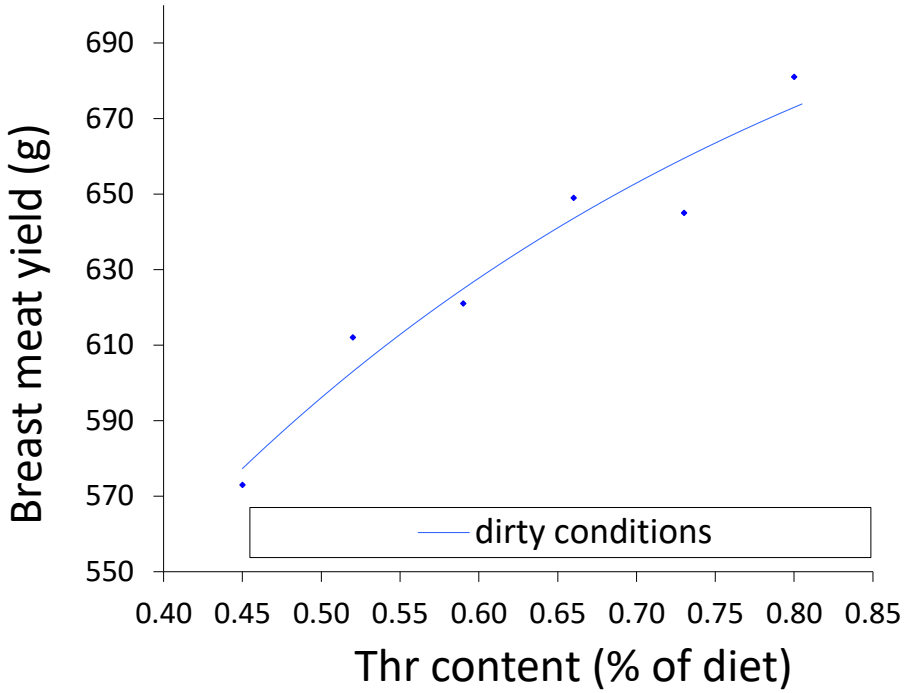
Another example:

Threonine needs increase with environmental/disease pressure

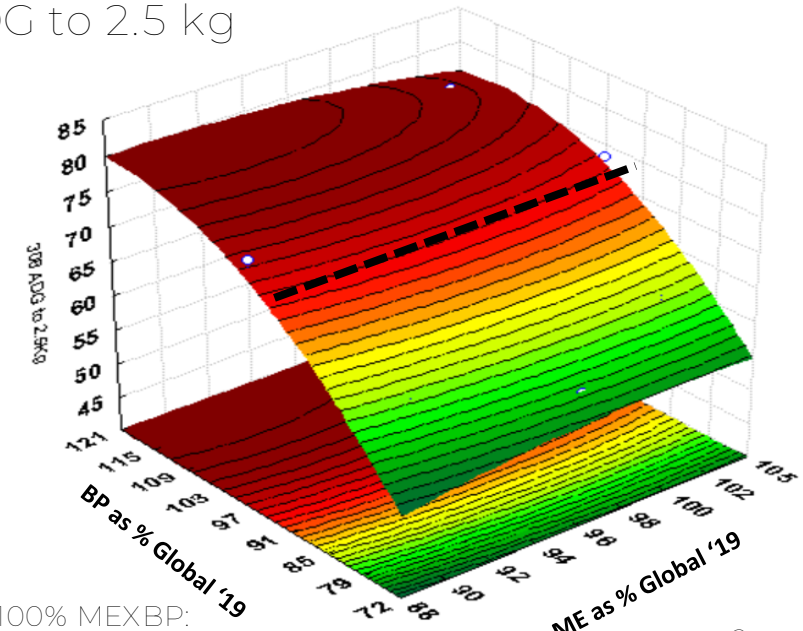
- Intestinal integrity:
  30% of the amino acid content of mucin is Thr
- Immunity
- Protein synthesis

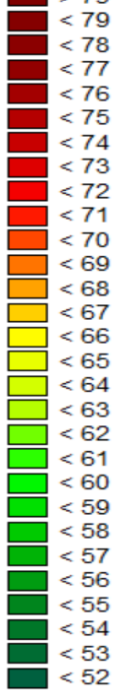
(…)



** Kidd et al., 2003*

ADG to 2.5 kg

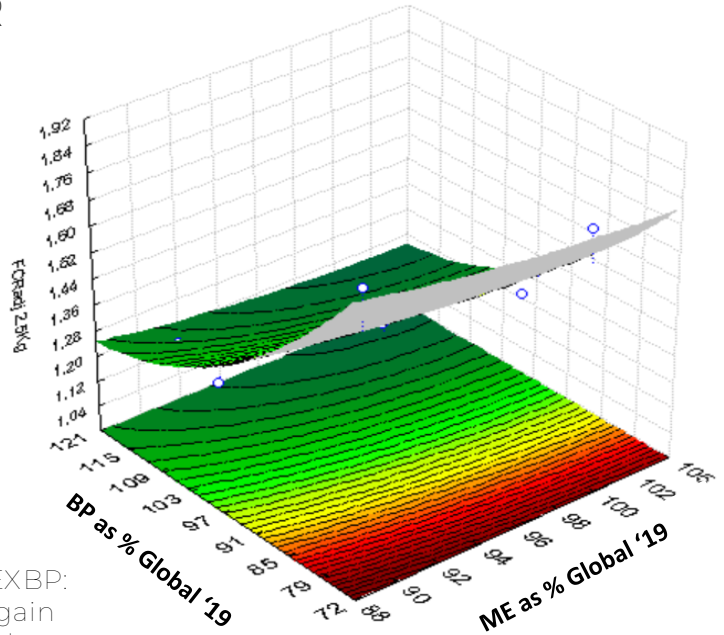


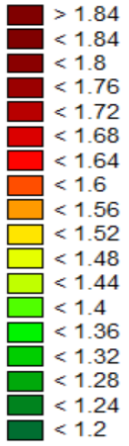


From 100% MEXBP:
7g (9%) to gain
20g (28%) to extend

R^2 = 0.91

2.5 kg FCR

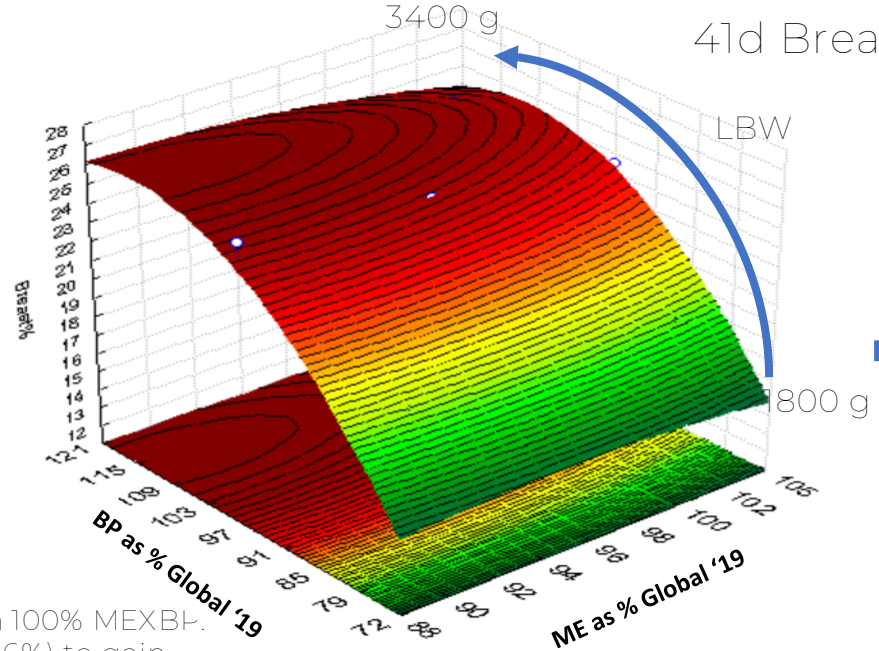


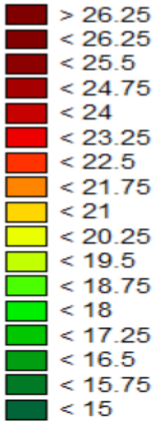


From 100% MEXBP:
16pts (12%) to gain
50pts (37%) to lose

R^2 = 0.93

41d Breast Yield (%)

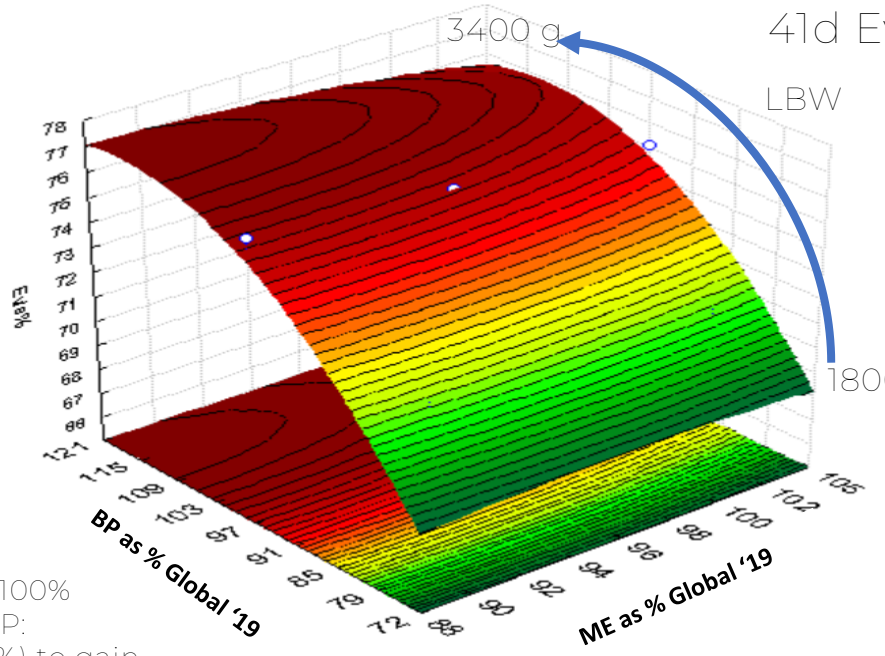


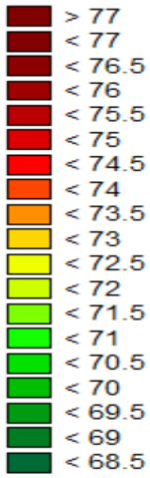


From 100% MEXBP:
1.5% (6%) to gain
9.75% (39%) to lose

R^2 = 0.93

41d Evis Yield (%)



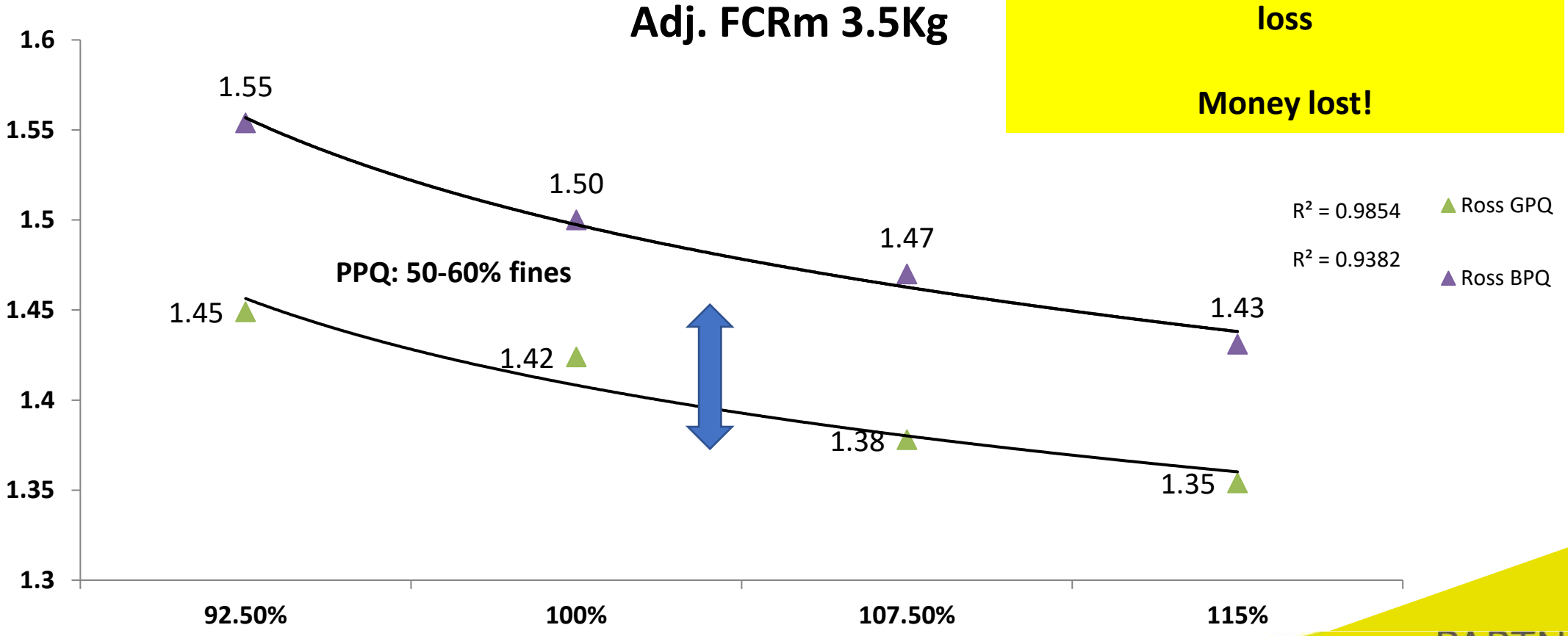


From 100% MEXBP:
1% (>1%) to gain
7.5% (10%) to lose

Response to balanced protein: Good pellet quality vs poor pellet quality

FCR impact predicted by fine >10%:
60% fines = 50% >10
Therefore: 50 X 0.0015 = 7.5 pts loss

Money lost!



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Environment - humidity

Temperature & humidity

Table 2.3: Principles of how optimum dry bulb temperatures for broilers may change at varying RH. Dry bulb temperatures, at the ideal RH at an age, are colored red.

Age (Days)	Dry Bulb Temperature °C (°F)			
	40 RH%	50 RH%	60 RH%	70 RH%
Day-old	36.0 (96.8)	33.2 (91.8)	30.8 (84.4)	29.2 (84.6)
3	33.7 (92.7)	31.2 (88.2)	28.9 (84.0)	27.3 (81.1)
6	32.5 (90.5)	29.9 (85.8)	27.7 (81.9)	26.0 (78.8)
9	31.3 (88.3)	28.6 (83.5)	26.7 (80.1)	25.0 (77.0)
12	30.2 (86.4)	27.8 (82.0)	25.7 (78.3)	24.0 (75.2)
15	29.0 (84.2)	26.8 (80.2)	24.8 (76.6)	23.0 (73.4)
18	27.7 (81.9)	25.5 (77.9)	23.6 (74.5)	21.9 (71.4)
21	26.9 (80.4)	24.7 (76.5)	22.7 (72.9)	21.3 (70.3)
24	25.7 (78.3)	23.5 (74.3)	21.7 (71.1)	20.2 (68.4)
27	24.8 (76.6)	22.7 (72.9)	20.7 (69.3)	19.3 (66.7)

**Temperature calculations based on a formula from Dr. Malcolm Mitchell (Scottish Agricultural College).*

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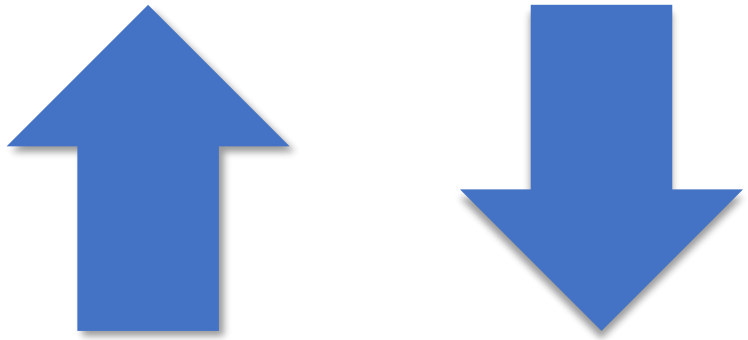
What builds humidity? Where does water come from?

- Birds breathing
- Drinker lines
- Poor ventilation
  - Under-ventilation
  - Holes
  - Inlets
  - Condensation
  - Low set temperature
- Gas heaters



- Proper ventilation

Height

- Height of nipple drinkers:
  - Brooding:
    - 2-3 days at eye height (CHICKEN'S eye height ☺)
  - Broilers:
    - Starting from drinking angle 35-45˚ to 75-85˚

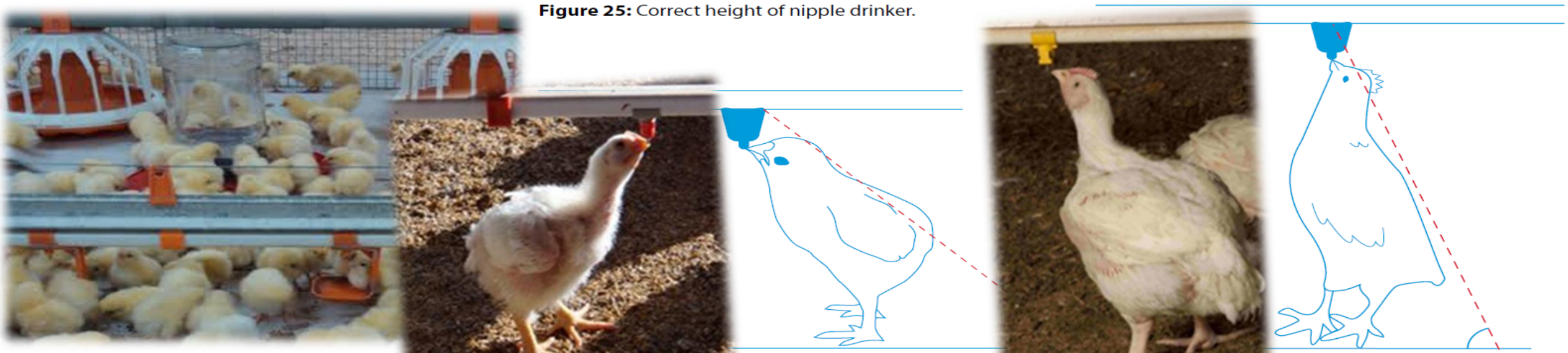
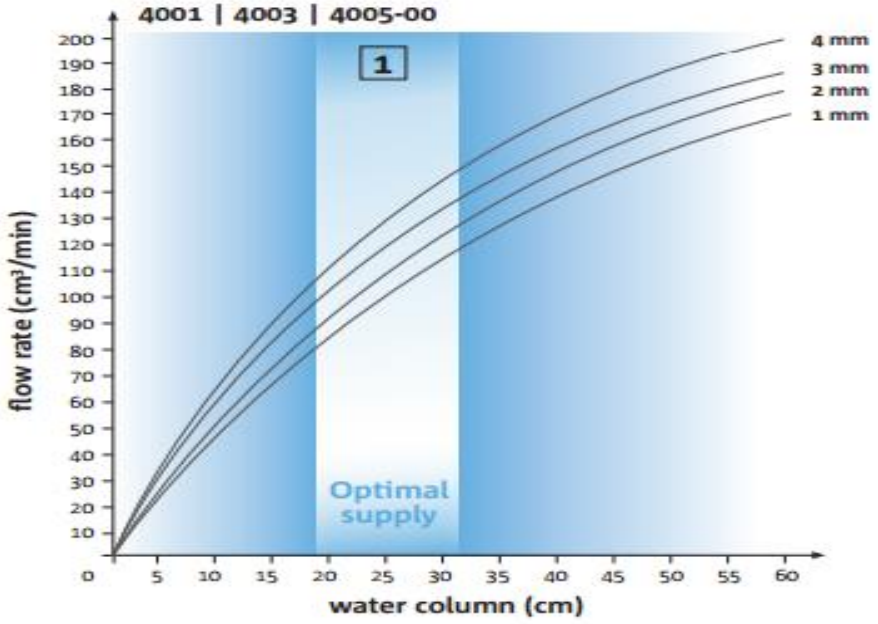
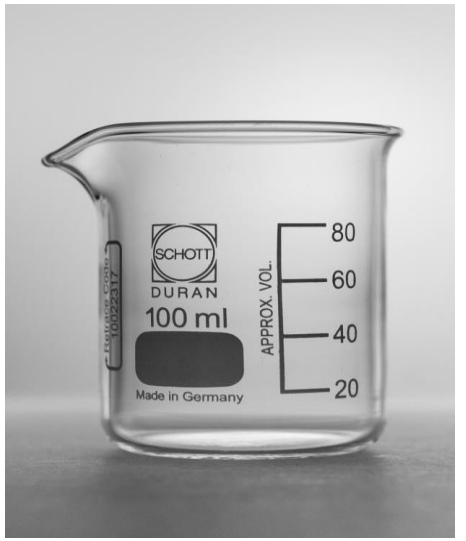


Figure 25: Correct height of nipple drinker.

Flow rate

- Water capacity of nipple drinkers @ 20cm water column:
  - 360˚ - flow rate 35-45 ml/min (laterally) – brooding
  - 360˚ - flow rate 80-100 ml (vertically) – brooding/broilers
  - vertical - flow rate 70-100 ml– broilers post brooding
- Checking flow rate

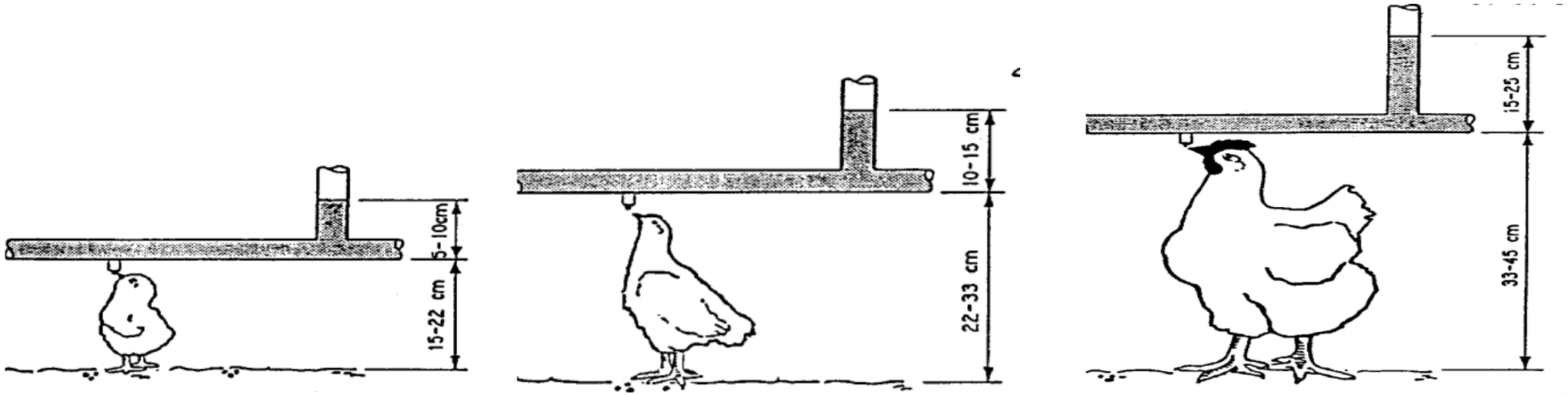




Pressure in nipple drinkers:

- Brooding:
  - 5-10 cm of water column
- Broilers:
  - General rule – same as height of chicks up to 25 cm

1st week 2nd/3rd week after 3 weeks



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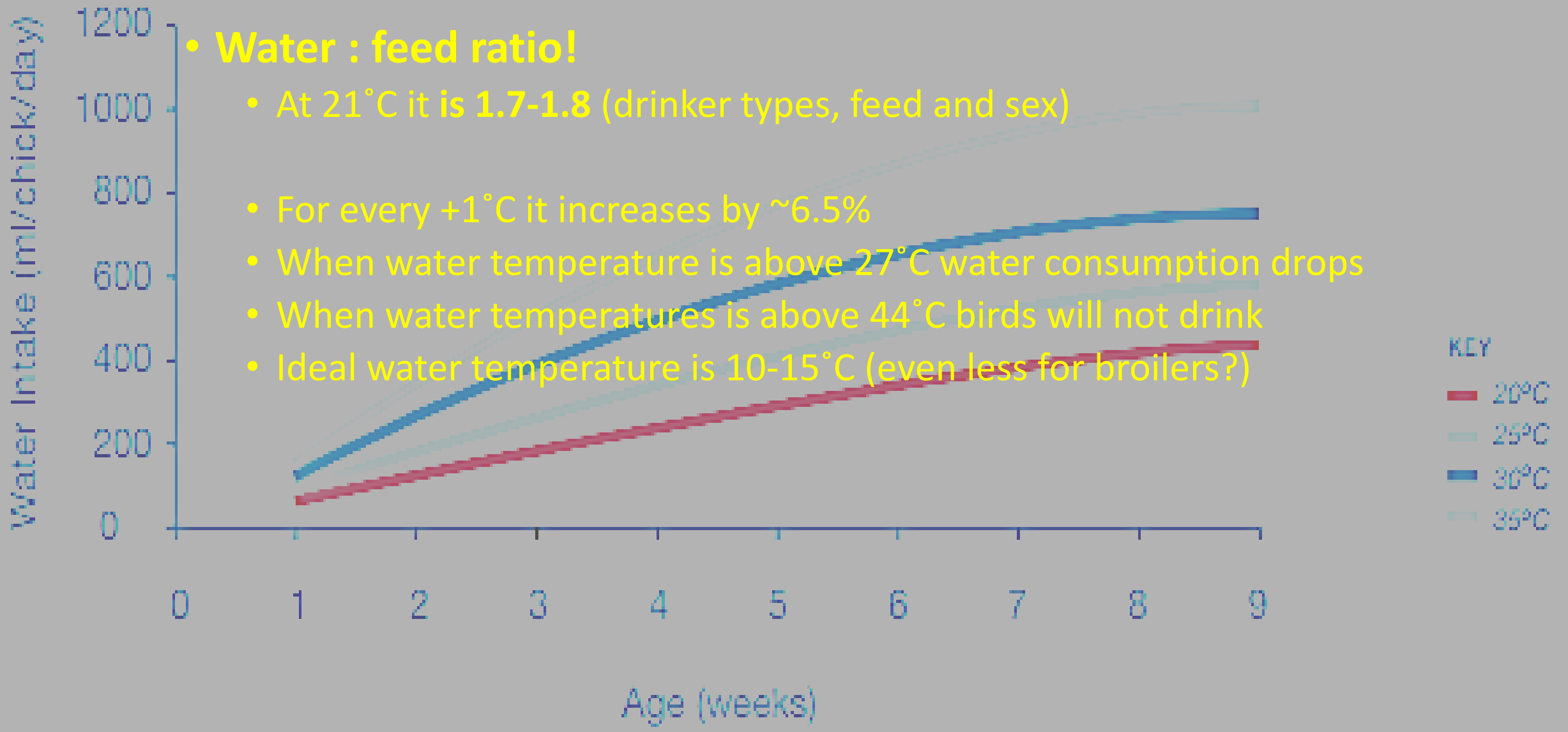
Best tool for assessment:



- **Water : feed ratio!**
  - At 21˚C it **is 1.7-1.8** (drinker types, feed and sex)
  - For every +1˚C it increases by ~6.5%
  - When water temperature is above 27˚C water consumption drops
  - When water temperatures is above 44˚C birds will not drink
  - Ideal water temperature is 10-15˚C (even less for broilers?)

Paying for errors in water line management

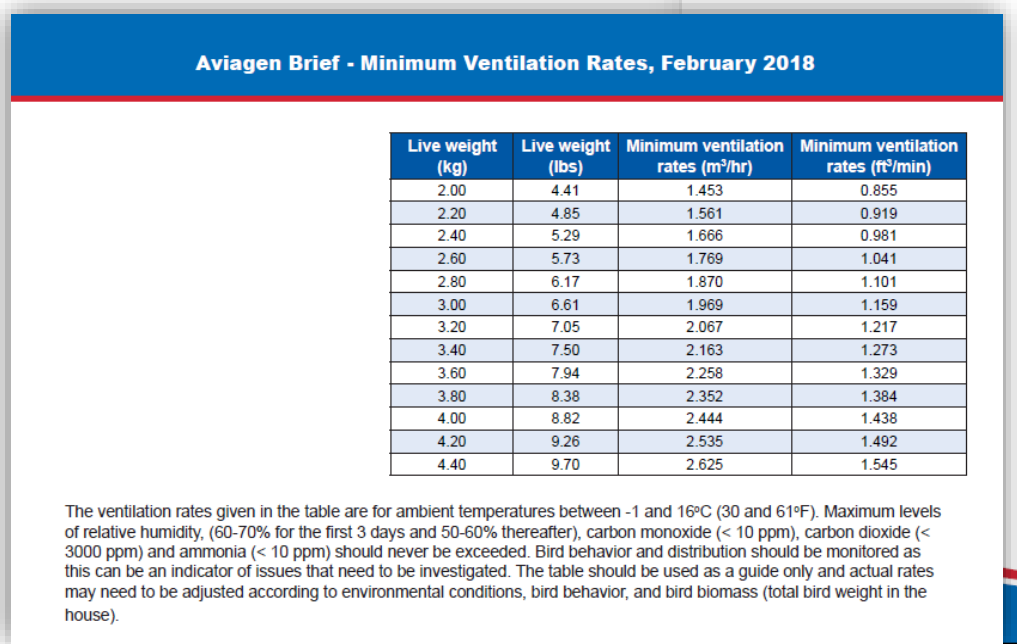
- Don’t forget that water usage is not the same as water consumption!
  - Nipple line height/pressure
  - Straight line
  - Leaking nipples
  - Swinging bell drinkers

- Ventilation……as a way to reduce in-house humidity.
- Excess water used (spilled) can’t be removed with minimum ventilation.

WU = WC + WS

Under-ventilation?

- Ventilation rates for broilers
- Ventilation capacity = fan capacity x number of fans
- Ventilation needed:
  - Stocking density
  - Weight/age
  - Feather coverage
  - Heating system
  - Litter quality
- Fan capacity



Aviagen Brief - Minimum Ventilation Rates, February 2018

Live weight (kg)	Live weight (lbs)	Minimum ventilation rates (m^3/hr)	Minimum ventilation rates (ft^3/min)
2.00	4.41	1.453	0.855
2.20	4.85	1.561	0.919
2.40	5.29	1.666	0.981
2.60	5.73	1.769	1.041
2.80	6.17	1.870	1.101
3.00	6.61	1.969	1.159
3.20	7.05	2.067	1.217
3.40	7.50	2.163	1.273
3.60	7.94	2.258	1.329
3.80	8.38	2.352	1.384
4.00	8.82	2.444	1.438
4.20	9.26	2.535	1.492
4.40	9.70	2.625	1.545

The ventilation rates given in the table are for ambient temperatures between -1 and 16°C (30 and 61°F). Maximum levels of relative humidity, (60-70% for the first 3 days and 50-60% thereafter), carbon monoxide (< 10 ppm), carbon dioxide (< 3000 ppm) and ammonia (< 10 ppm) should never be exceeded. Bird behavior and distribution should be monitored as this can be an indicator of issues that need to be investigated. The table should be used as a guide only and actual rates may need to be adjusted according to environmental conditions, bird behavior, and bird biomass (total bird weight in the house).

Aviagen

AVIAGEN BRIEF

February 2018

Minimum Ventilation Rates for Todays Broiler

Introduction
The next broiler handbook is due to be released in 2018. With continuing genetic progress in broiler performance one of the main updates is that of recommended minimum ventilation rates which have been increased to allow for improvements in daily growth rate and overall higher biomasses at younger ages.

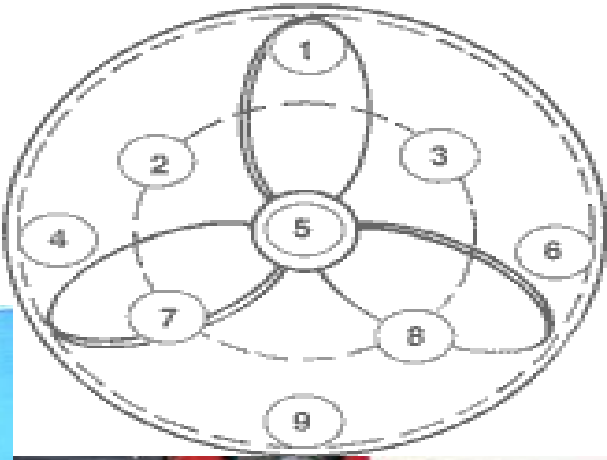
Minimum Ventilation Rates for Todays Broiler
The table below gives a revised set of minimum ventilation rates for broilers. These have been updated to account for improvements in broiler performance in recent years and reflect the broilers need for higher ventilation rates as a result of this.

Table 1: Updated minimum ventilation rates.

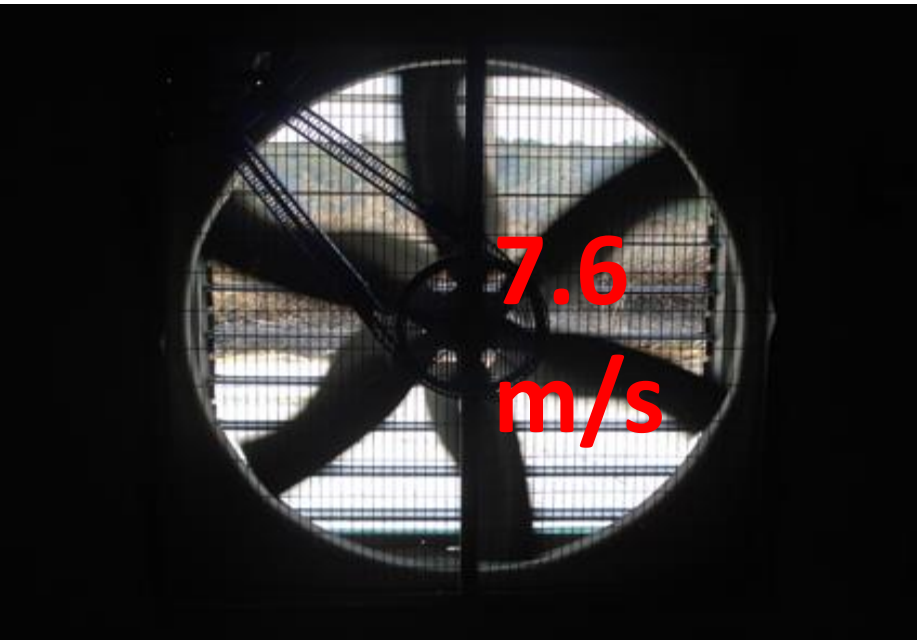
Live weight (kg)	Live weight (lbs)	Minimum ventilation rates (m^3/hr)	Minimum ventilation rates (ft^3/min)
0.05	0.11	0.080	0.047
0.10	0.22	0.141	0.083
0.15	0.33	0.208	0.122
0.20	0.44	0.258	0.152
0.25	0.55	0.305	0.180
0.30	0.66	0.350	0.206
0.35	0.77	0.393	0.231
0.40	0.88	0.435	0.256
0.45	0.99	0.475	0.280
0.50	1.10	0.514	0.303
0.55	1.21	0.552	0.325
0.60	1.32	0.589	0.347
0.65	1.43	0.625	0.368
0.70	1.54	0.661	0.389
0.75	1.65	0.696	0.410
0.80	1.76	0.731	0.430
0.85	1.87	0.765	0.450
0.90	1.98	0.798	0.470
0.95	2.09	0.831	0.489
1.00	2.20	0.864	0.509
1.10	2.43	0.928	0.546
1.20	2.65	0.991	0.583
1.30	2.87	1.052	0.619
1.40	3.09	1.112	0.654
1.50	3.31	1.171	0.689
1.60	3.53	1.229	0.723
1.70	3.75	1.286	0.757
1.80	3.97	1.343	0.790
1.90	4.19	1.398	0.823

Fan Capacity

- Fan capacity [m^3/hr]
  - Don't believe – measure it!
    - Measure the average speed of air going through the fan
    - Measure radius [m] of the fan
    - **πr^2** [m^2] * **V** [m/s] * **3600 = capacity** [m^3/h]
  - Reduced due to high under pressure, light traps, dirt, wear/tear



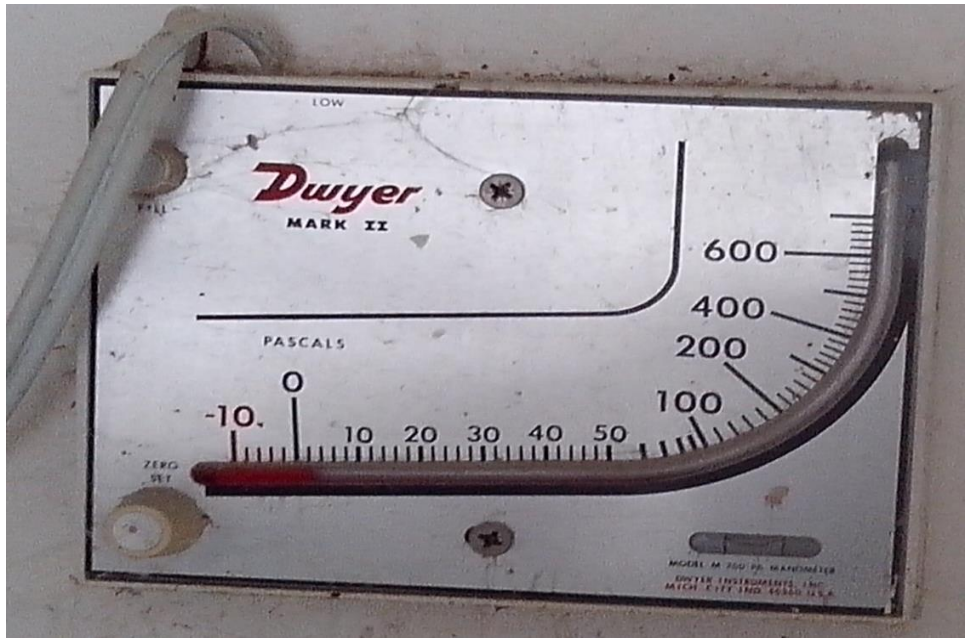
Under-ventilation - fans under-capacity



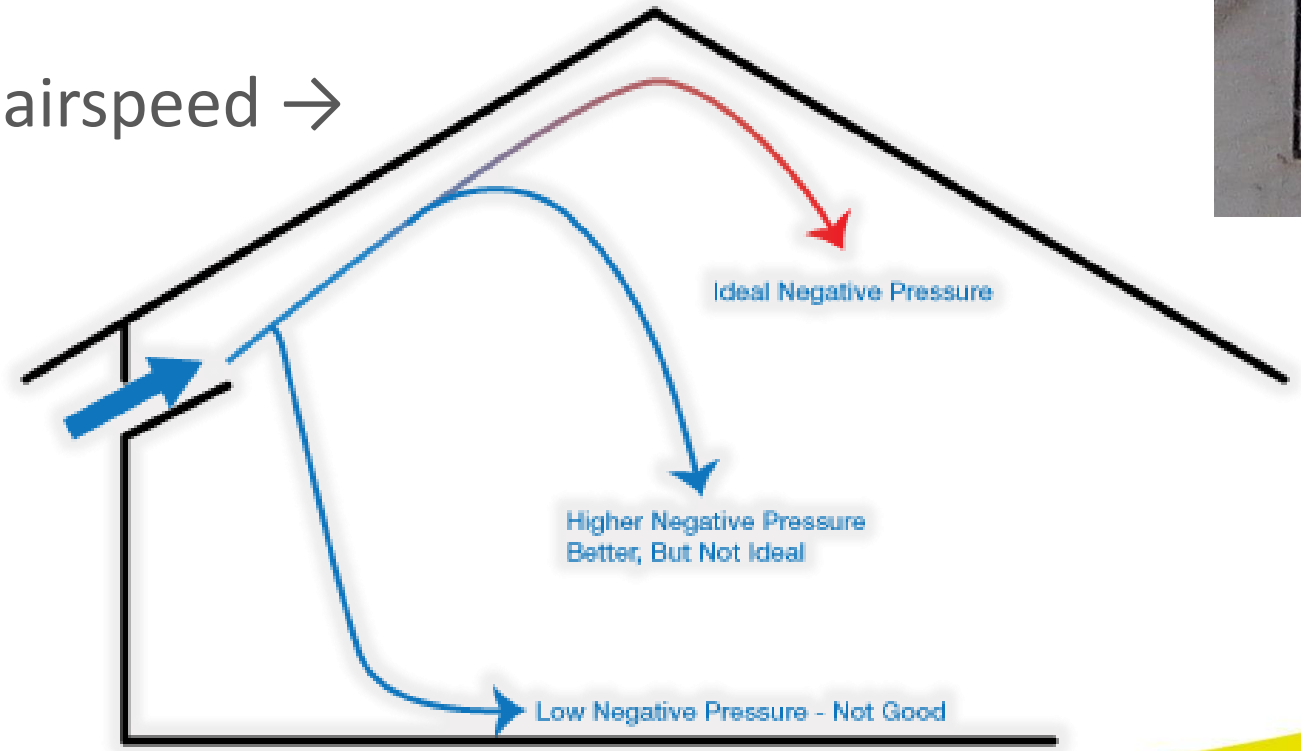
- Incorrect opening of the shutter reduced the capacity of the fan by **43%**!

Too low underpressure?

- Miscalculated
- Lower capacity of fans
- Too much open inlets

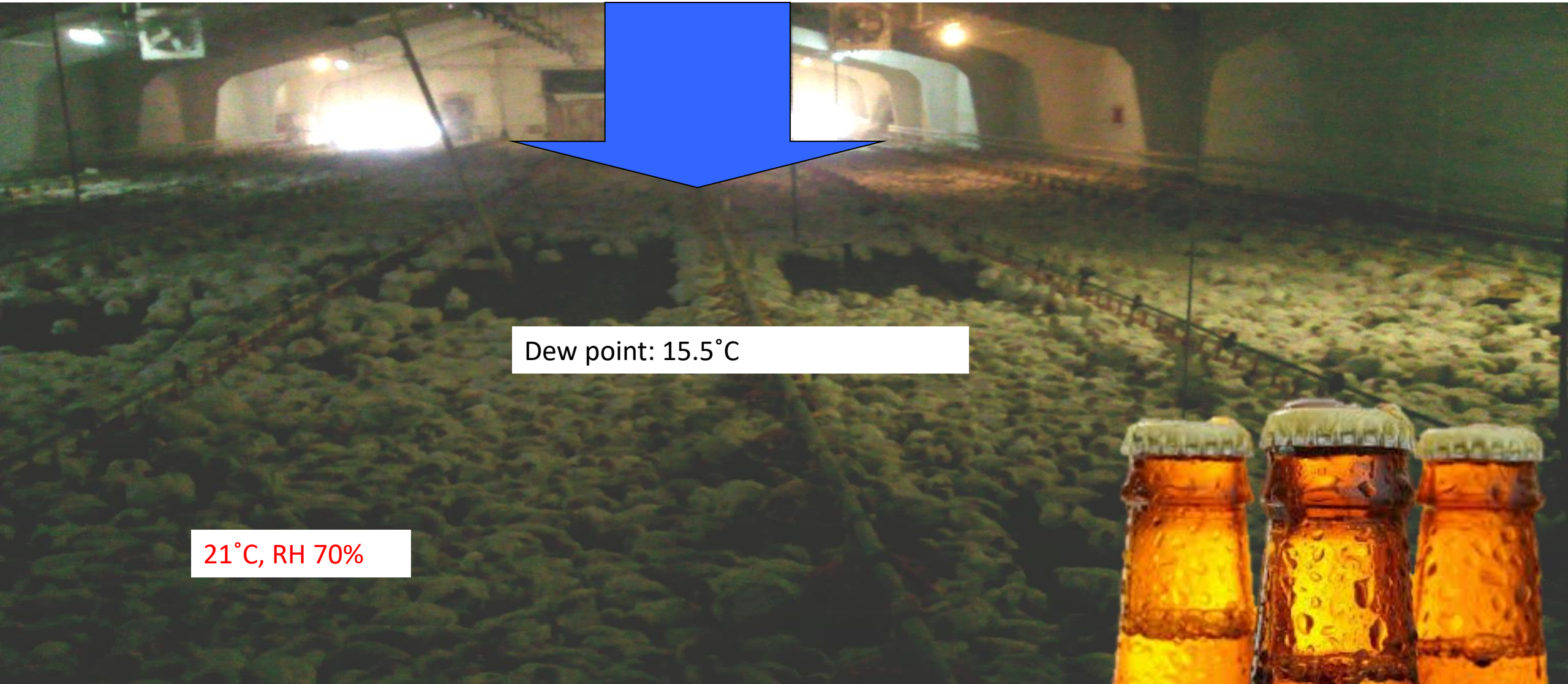


- Low airspeed →



Condensation?

2 examples



Instead conclusion

1. Clean environment (with as longer downtime)
2. Fastest possible start
3. Balanced & good physical quality feed
4. Keep environment (humidity) under control

PARTNERS IN PROGRESS

Questions & Answers

THANK YOU!