

Hatchery Talks

3 Tips to minimize the impact of prolonged hatching egg storage



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Before we start ...

- Polls
- Questions



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Over-supply of hatching eggs

- **Foreseen:** seasonal changes
- **Unforeseen:** market disruptions (e.g. Covid-19)



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Response to over-supply

- **Selling hatching eggs (export)**
- **Earlier culling of breeders**
- **Forced moulting of breeders**
- **Prolonged egg storage**
- **Last option → pass on to egg industry**

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Prolonged egg storage

- Reduced internal egg quality
- Egg weight loss
- Reduced viability of embryo → H% ↓
- Reduced chick quality
- Longer incubation time



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Storage affects egg quality/weight

- Weight loss 0.05 ± 0.01 gram/day → air cell increases in size
- Water diffuses from albumen to yolk (yolk mottling)
- Yolk membrane becomes thinner
- CO_2 diffuses out of egg → thinner albumen

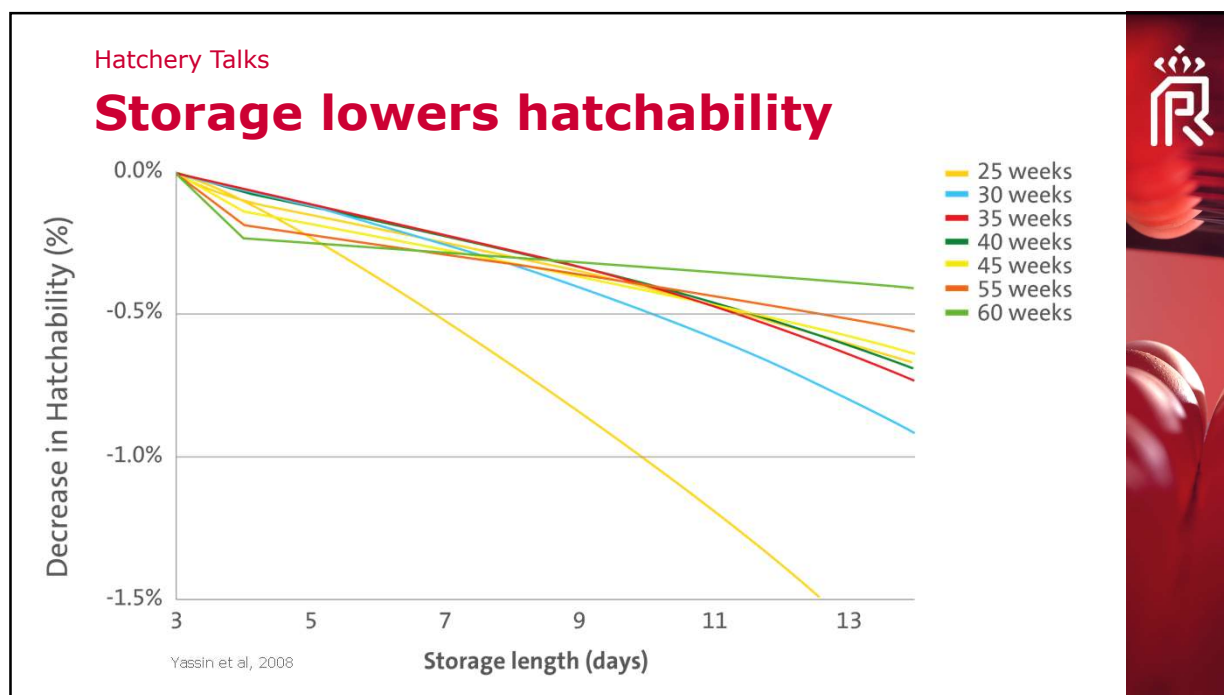


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Poll

Storing hatching eggs for max. 7 days under good conditions does not have any negative effects on hatchability and chick quality

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Storage affects chick quality

Pasgar©Score, especially navel quality

Storage duration (days)	Pasgar©Score mean (n)
3	9.4 (27)
11	8.9 (29)

Strong indications reduced 7-day body weight

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Poll

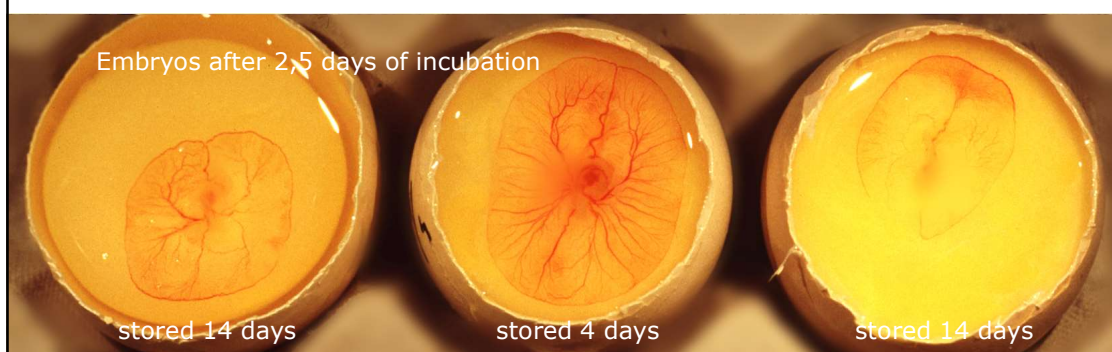
Prolonged hatching egg storage affects the performance of broilers

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Storage affects incubation time

- Lower rate of development
- Incubation time + 1 hour/day of storage



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Storage affects incubation time

- Lower rate of development
- Incubation time + 1 hour/day of storage

Storage time	3 days	18 days
Duration from setting to internal pipping	468 hrs	477 hrs
Duration of internal pipping till emergence	17.8 hrs	24.7 hrs

Ref. Tona et al. (2003). Poultry Science 82: 736

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Best practice

- Set hatching eggs 2–3 days after laying
- Avoid storing eggs for longer than 7 days
- Expect to store for longer than 10 days?



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3 Tips

- 1 Create optimal storage conditions
- 2 Store sharp-end-up or turn
- 3 Apply heat treatment during storage



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Poll

What is the optimal temperature in the egg storage room when eggs need to be stored for > 10 days?

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Tip 1 - Optimal storage conditions

Storage duration (days)	Temperature (°C/°F)	Humidity (%)	Egg orientation
0 – 3	18 – 21 / 64.4 – 69.8	75 – 85	Blunt end up
4 – 7	15 – 17 / 59.0 – 62.8	75 – 85	Blunt end up
8 – 10	12 – 14 / 53.6 – 57.2	80 – 85	Blunt end up
> 10	12 – 14 / 53.6 – 57.2	80 – 85	Sharp-end-up or turning 2 (4-6) x per day

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Points of attention during storage

- Not too cold at breeder farm
- Uniformity
- Be aware of 'sweating'

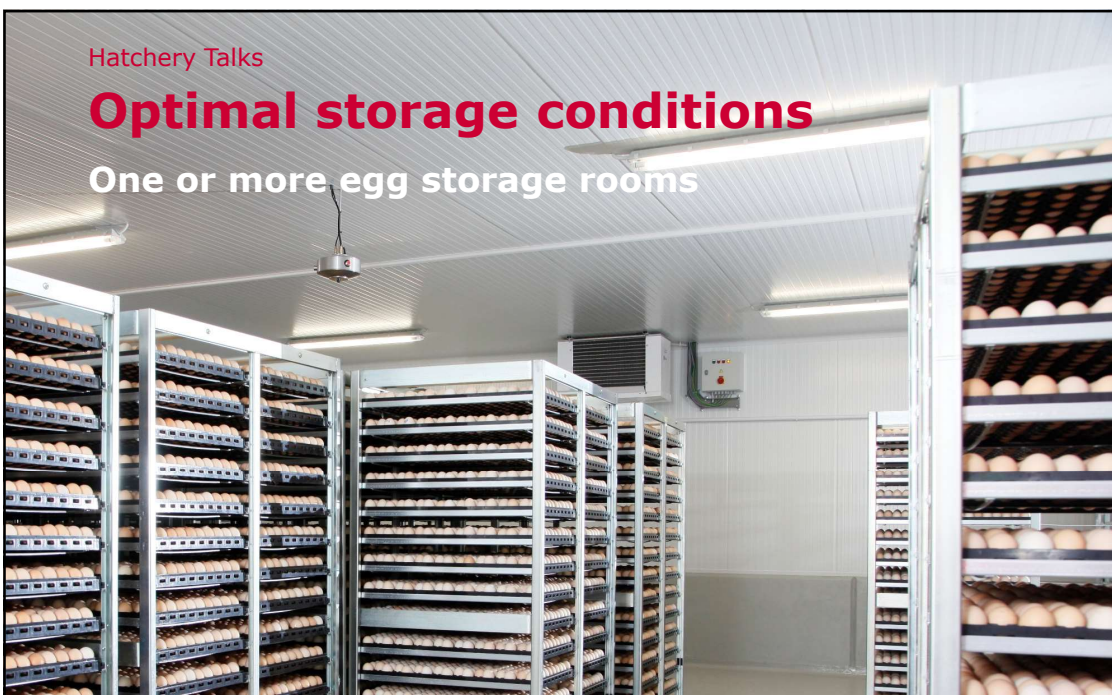


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Optimal storage conditions

One or more egg storage rooms



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'Sweating'

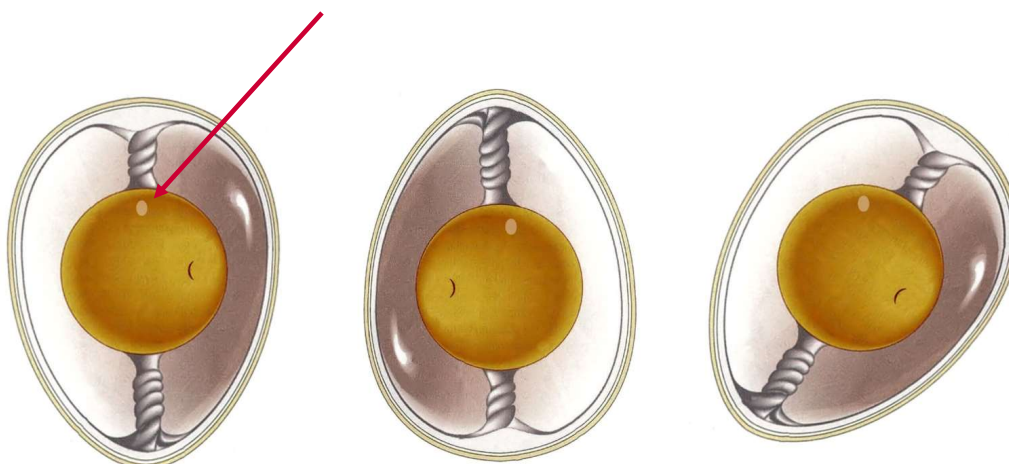
Eggs will sweat if RH% outside the storage room is higher than:

Temperature storage room ¹	Temperature outside storage room			
	19 °C/66.2 °F	21 °C/69.8 °F	23 °C/73.4 °F	25 °C/77.0 °F
21 °C/69.8 °F	> 88%	> 78%
18 °C/64.4 °F	> 94%	> 83%	> 73%	> 65%
16 °C/60.8 °F	> 82%	> 73%	> 64%	> 57%
14 °C/57.2 °F	> 72%	> 64%	> 56%	> 50%
12 °C/53.6 °F	> 63%	> 56%	> 50%	> 44%

¹ Assumption: egg temperature = temperature of egg storage room

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Tip 2 - Sharp-end-up or turn

90°; 2 – (4-6)x/day

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Tip 3 - Heat treatment during storage

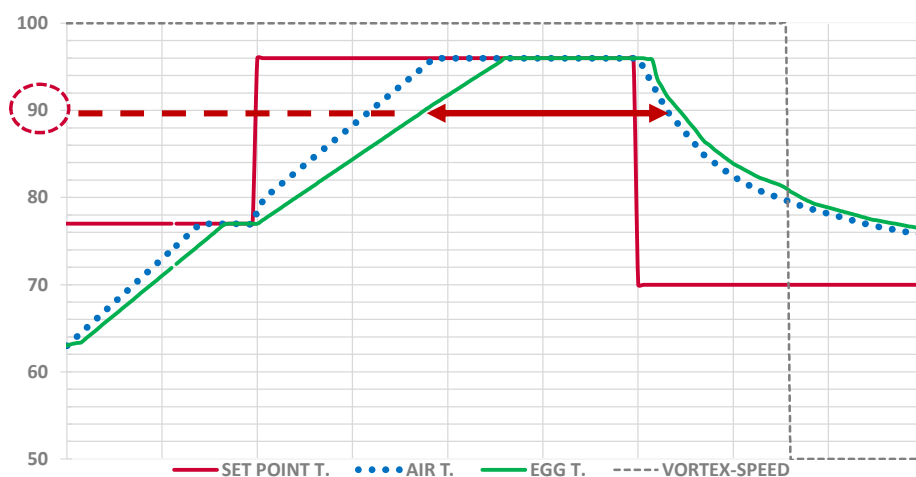
- A. Pre-heat to 25 °C/77 °F
- B. Heat to EST > 32 °C/90 °F; duration!
- C. Cool to < 25 °C/77 °F



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Conceptual graph



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Is heat treatment always a success?

It depends on the post-lay egg cooling and further storage conditions!



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Effect on embryo

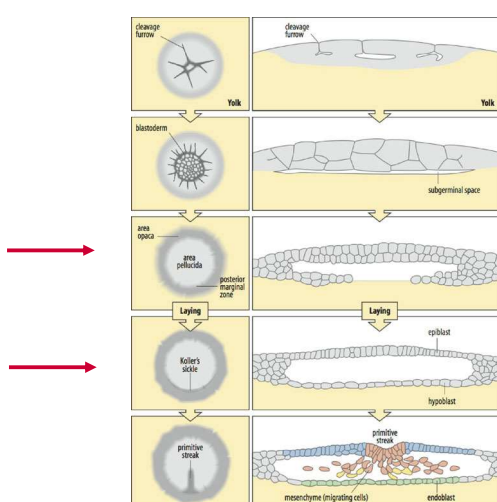
Embryonic stage at oviposition

Stage IX-X
(Ref: Eyal-Giladi, 1976)

Embryonic stage after cooling to room temperature

Stage XII-XIII
(Ref: Eyal-Giladi, 1976)

Ref: Gilbert, 2006



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Precautions heat treatment

- Eggs on setter trays in setter trolleys
- Duration EST > 32 °C/90 °F
 - 1st time 3–4 days after laying
 - Repeat every 5–6 days
- No warm eggs back to storage room



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Proposed program heat treatment

SmartCenterPro™

HEAT_TREAT IHCfreq | SSP

⌚	↕	↕	↕	↕CO ₂	↕	↕	↕
-0.18	77.0	55	0	0.40	Off	100	0
-0.14	96.0	55	0	0.40	Off	100	0
-0.09	70.0	55	0	0.40	Off	100	0
-0.05	70.0	55	0	0.40	Off	50	0
0.00	70.0	55	0	0.40	Off	50	0

3½ - 5 hrs
EST > 90 °F

Modify program if needed:

- **Pre-heat:** T_{AIR} approx. 1 – 2 hours at set point 77 °F
- **Heat treatment:** T_{AIR} approx. 2 – 2 ½ hours at set point 96 °F before start cooling
- **Cooling:** T_{AIR} to < 77 °F (= 25 °C)

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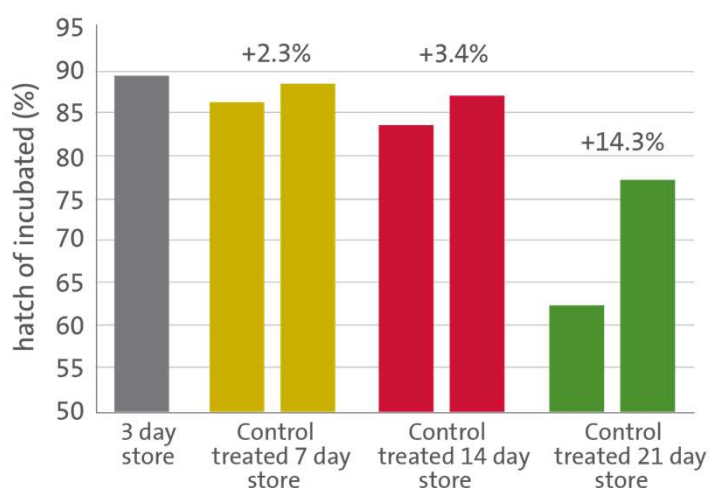
Poll

In case you have applied heat treatment of hatching eggs, the effects were mostly...

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Potential of heat treatment



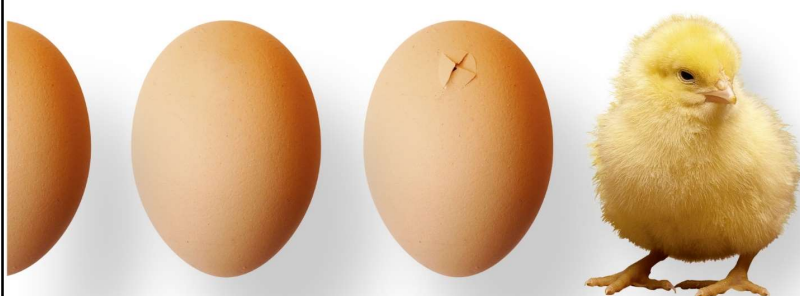
Ref: Nicholson, 2013. International Hatchery Practice 27(6) 23-24

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Summary

- 1 Create optimal storage conditions
- 2 Store sharp-end-up or turn
- 3 Apply heat treatment during storage



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When eventually setting long stored eggs

- Prevent 'sweating'
- Longer preheating
- Set earlier
- Increase turning frequency
- Expect reduced hatchability

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Thanks for watching!

- **Webinar-replay + hand-out**
- **Knowledge section at our website**

See you at our next webinar in September

