Hatchery Talks

In-ovo vaccination and hatchery management

Before we start …

- Polls
- Questions

Contents

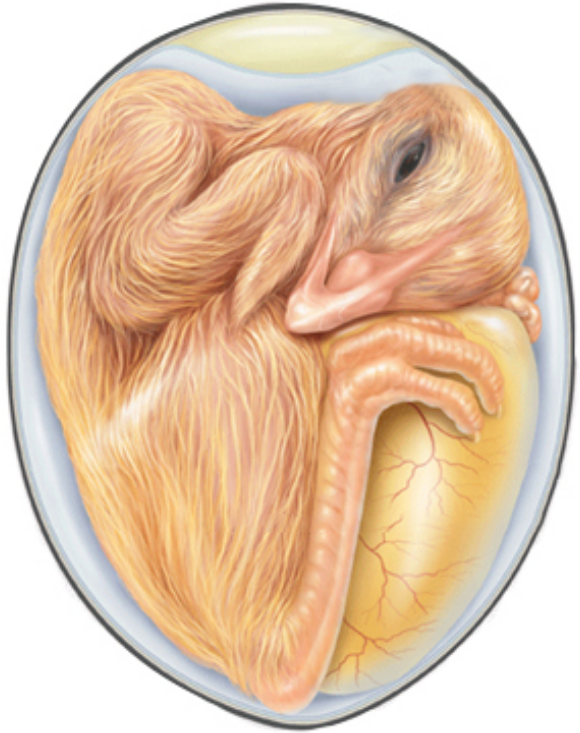
- Why in-ovo vaccination
- Critical succes factors
- Implications for hatchery management

In-ovo vaccination

Why

Definition of in-ovo vaccination

Procedure to deliver a vaccine inside the egg with an embryo in the late stage of development, targeting specific sites where the vaccine is capable of stimulating an immune response.



‘Mass vaccination of individual embryos’

In-ovo vaccination as alternative

Why in-ovo vaccination

- **Excellent alternative for farm vaccinations**
- **Excellent alternative for day-old vaccinations**

- Earlier protection/better disease prevention
- Less stress → better immunity
- Few people involved (training; biosecurity)
- High capacity (upto 60.000 eggs/hour)
- If done correctly: better application of expensive vaccine
- More and more vaccines available; even combinations (HVT + ND + IBD)

In-ovo vaccination
Critical succes factors

Critical success factors

Objectives of in-ovo vaccination

Good immune response

- Correct site of injection
- Vaccine

No reduction of hatchability

- Not kill embryo
- No contamination

Critical succes factors

Five interacting factors determine success:

1. Egg location
2. Shell penetration
3. Site of injection
4. Vaccine delivery
5. Sanitation

Note: Not all will be discussed in detail; relation with hatchery management is the main topic of this presentation

Critical succes factors

Five interacting factors determine success:

1. Egg location → **related to egg setting and setter tray**
2. Shell penetration
3. Site of injection → **related to embryo age + uniformity**
4. Vaccine delivery
5. Sanitation → **related to egg & hatchery hygiene**

Note: Not all will be discussed in detail; relation with hatchery management is the main topic of this presentation

Critical success factors

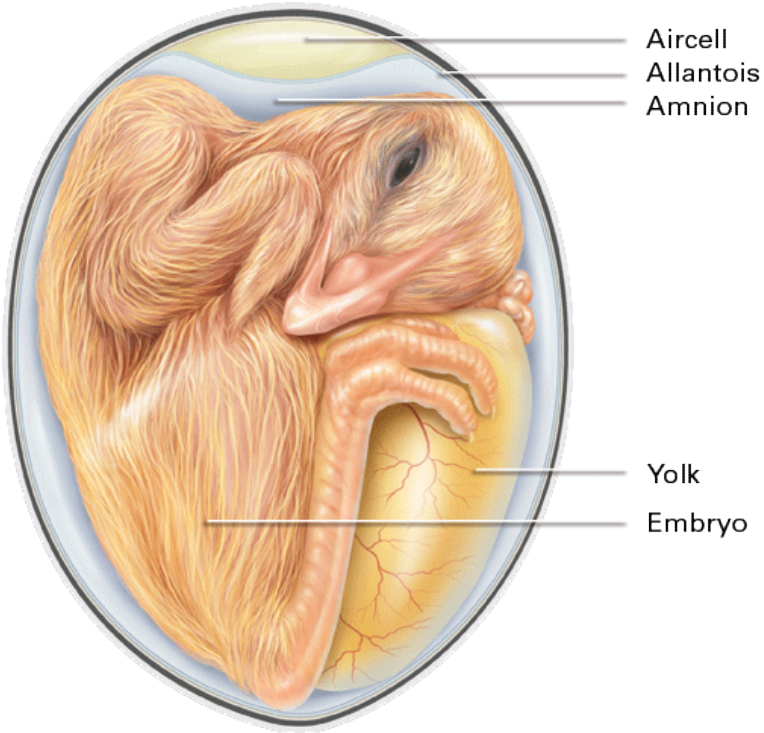
Site of injection is very crucial

Correct:

- Embryo (SQ/IM)
- Amniotic sac

Wrong:

- Air cell
- Allantois sac
- Yolk sac



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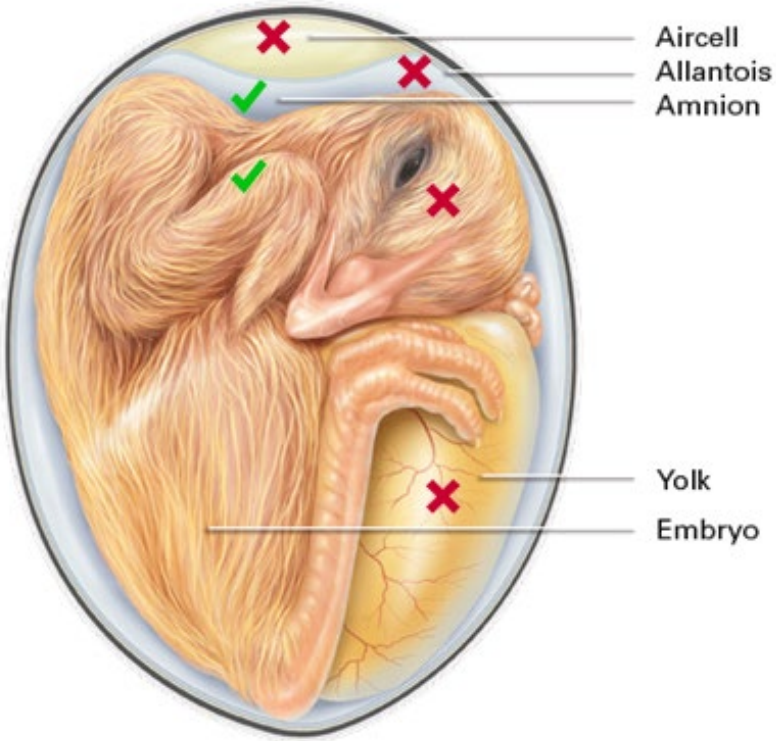

Site of injection & optimal timing

- Embryo should be in position to hatch (head under right wing)
- The stalk of yolk sac should be entering the abdomen
- Maximum of 1 – 2 % external pipping

Site of injection & optimal timing

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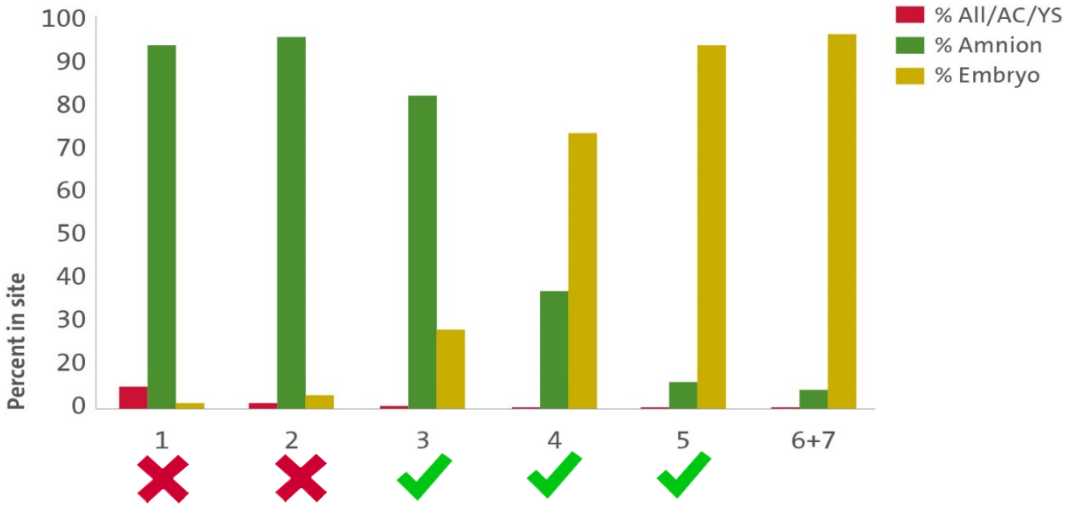
1. **Optimal incubation time?**
2. **Is this =/≠ to embryo age?**

Critical success factors

Site of injection & embryo stage

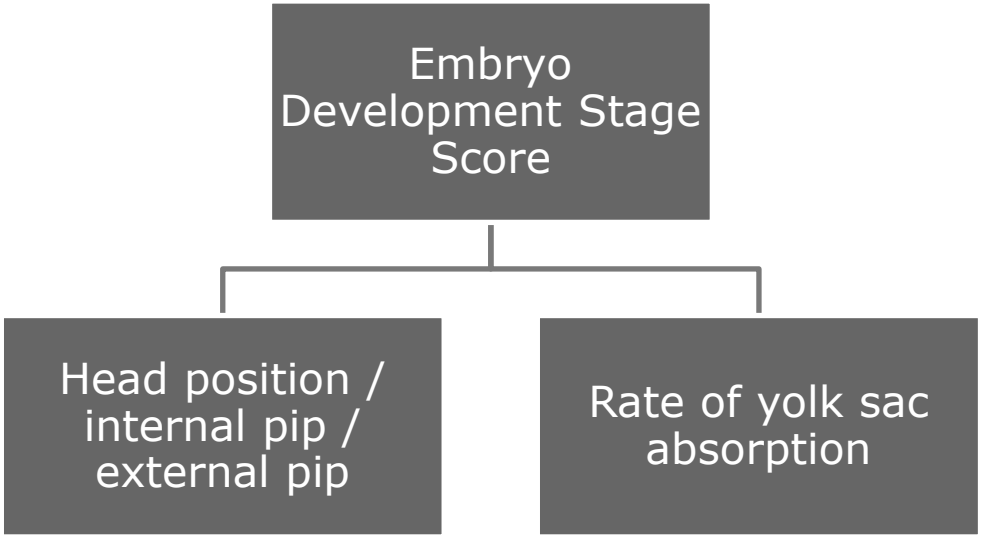
Vaccination window: 17½ - 19¼ days of incubation

More important: Embryo Development Stage Score



Site of injection & embryo stage

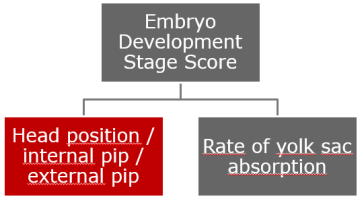
- **Vaccination window:** 17½ - 19¼ days of incubation
- **More important:** Embryo Development Stage Score



Critical success factors

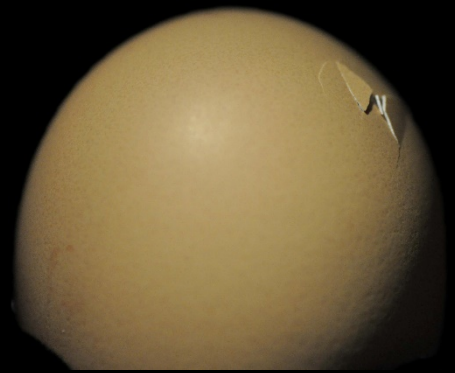
Site of injection & embryo stage

Head position / IP / EP



Head-under-wing (1 point)

Internal pipping (2 points)



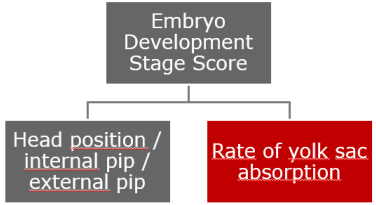
External pipping (3 points)

Photo courtesy of Zoetis

Critical success factors

Site of injection & embryo stage

Yolk sac absorption rate



Stalk/intestines
(1 point)

Bi-lobe
(2 points)

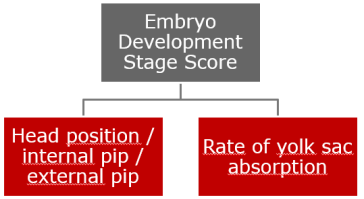
No bi-lobe
(3 points)

Absorbed
(4 points)

Photo courtesy of Zoetis

Critical success factors

Examples embryo stage



Stage 3:

1 + 2

Stage 6:

3 +

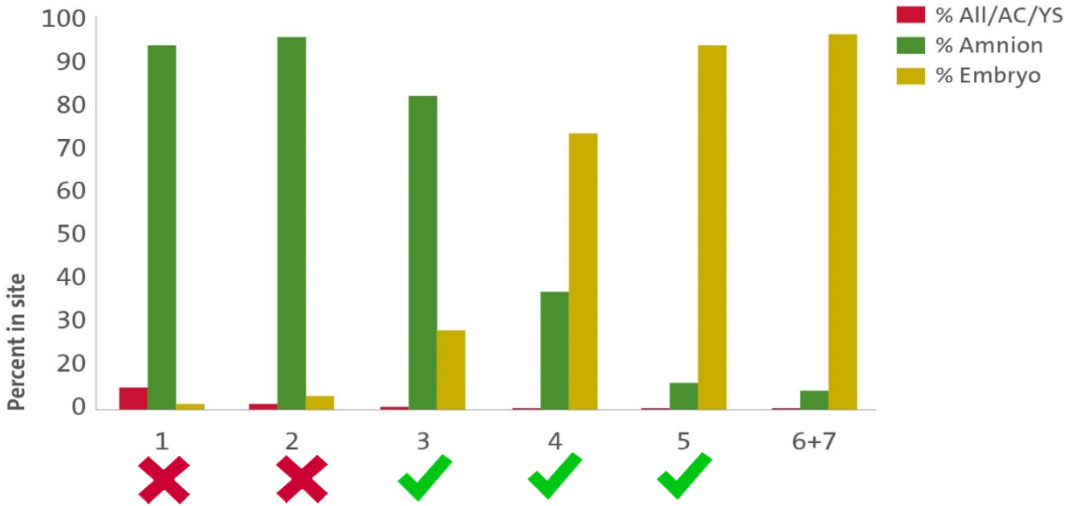
3

Photo courtesy of Zoetis

Critical success factors

Site of injection & embryo stage

- **Vaccination window:** 17½ - 19¼ days of incubation
- **BUT:** Embryo Development Stage **≥ 3!!!**



In-ovo vaccination

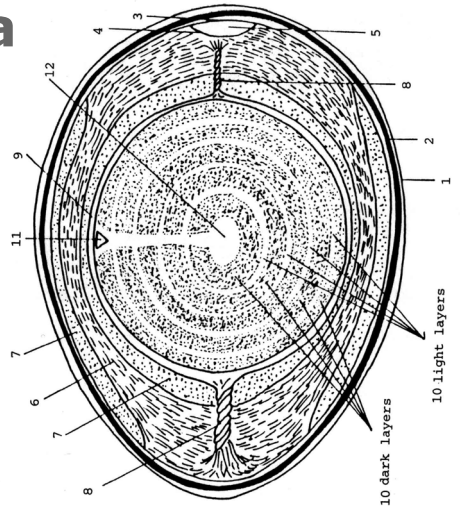
Implications for hatchery management

Implications for hatchery management

- **Egg & hatchery hygiene** (needle design and sanitation also important!)
- **Egg grading & position**
- **Uniformity of development**

Egg and hatchery hygiene

The vaccination hole in the egg is a breach in its defence system!



- Risk for air borne infection
- Fungus (Aspergillus)
- Bacteria from humidifiers
- Exploders during transfer

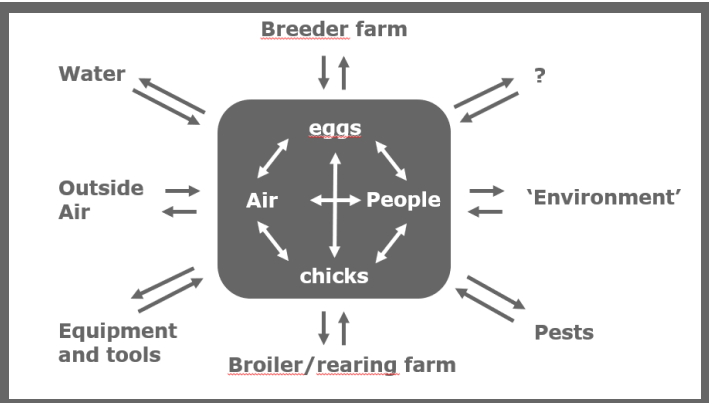
Implications for hatchery management

Aspects of egg hygiene

Aspects of hatchery hygiene

3 main aspects

- Vector management
- Avoid cross contamination
- Cleaning and disinfection



Implications for hatchery management

Egg grading & position

- Only clean eggs!
- No hair cracks!
- Sharp end down!
- Well-supported

Implications for hatchery management

What if egg is incubated like this?

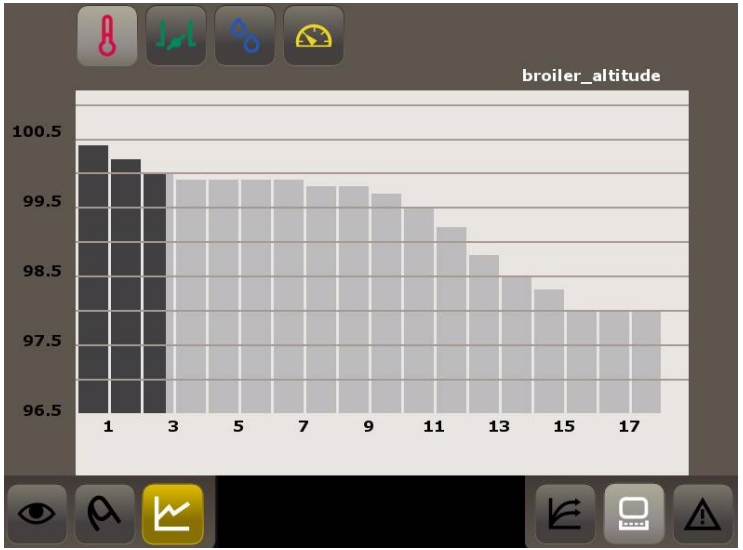
Flock (May.2016)	Age of Flock	Group	Treatment	Number of Set Eggs	Chicks	Hatch ability %	Fertility (Real) %	H.O.F %	Diff. (HOF)	0-7 %	8-18 %	19-21 %
Cobb	41	Trial	Up Side Down	300	230	76,7	97,0	79,0	-16,0	3,7	9,3	3,7
		Control	Normal	300	281	93,7	98,6	95,0		0,8	0,3	0,0
Ross 308	39	Trial	Up Side Down	300	221	73,7	94,3	78,1	-13,0	3,3	4,7	8,7
		Control	Normal	300	265	88,3	97,0	91,1		1,3	1,3	2,7
Ross 308	49	Trial	Up Side Down	300	209	69,7	93,3	74,6	-12,7	3,7	3,0	9,3
		Control	Normal	300	261	87,0	99,6	87,3		0,3	0,9	0,0
Ross 308	31	Trial	Up Side Down	300	223	74,3	94,7	78,5	-16,7	4,3	1,3	9,0
		Control	Normal	150	140	93,3	98,0	95,2		4,0	0,7	1,3
Ross 308	35	Trial	Up Side Down	300	229	76,3	97,3	78,4	-16,8	4,3	0,0	15,3
		Control	Normal	300	277	92,3	97,0	95,2		2,3	0,0	1,3
Hubbard	54	Trial	Up Side Down	300	191	63,7	86,7	73,5	-15,8	2,3	0,3	18,0
		Control	Normal	300	241	80,3	90,0	89,3		2,7	0,3	5,3
Hubbard	53	Trial	Up Side Down	300	194	64,7	91,3	70,8	-21,0	3,0	0,3	18,3
		Control	Normal	300	256	85,3	93,0	91,8		1,7	2,3	1,3

With in-ovo vaccination much worse/even lower!

Uniformity of development

Incubation time =/≠ embryo age?

- Post-lay cooling profile
- Egg storage time
- Breed
- Egg size
- Heat-up time
- Incubation temperature
- Etc...



Variation between AND within batches of eggs!!!

Post-lay cooling profile

Speed of cooling-down 41 → < 25 °C determines embryo-stage at start incubation

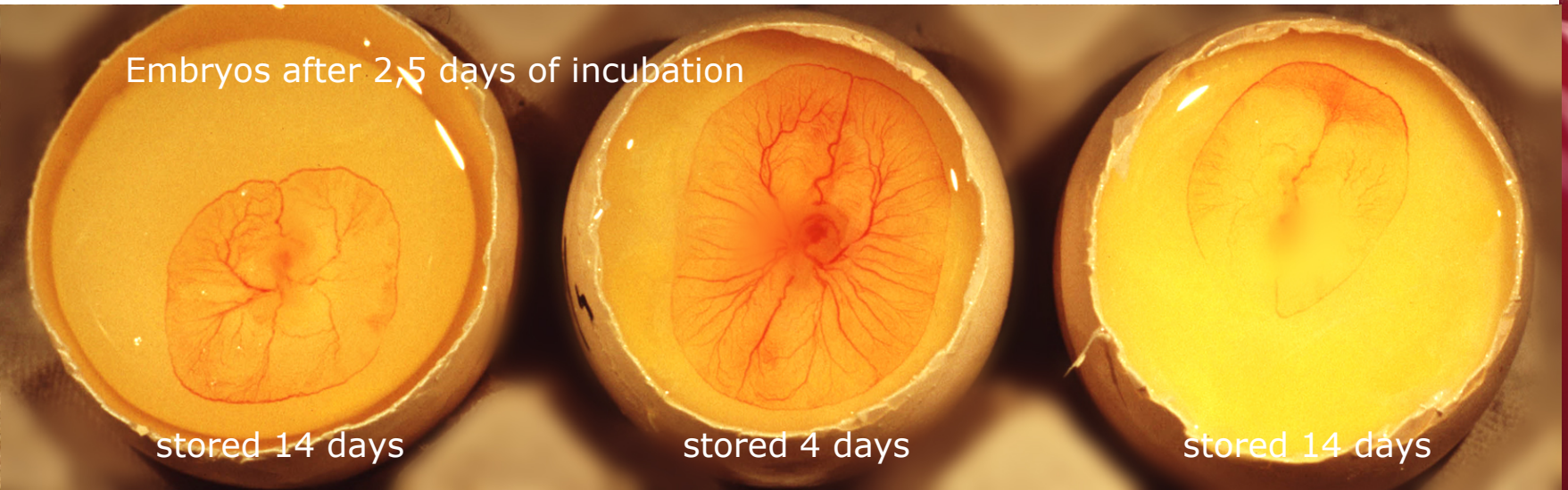




Effect of egg storage

Embryo stage 3 approx. at 18 days of incubation

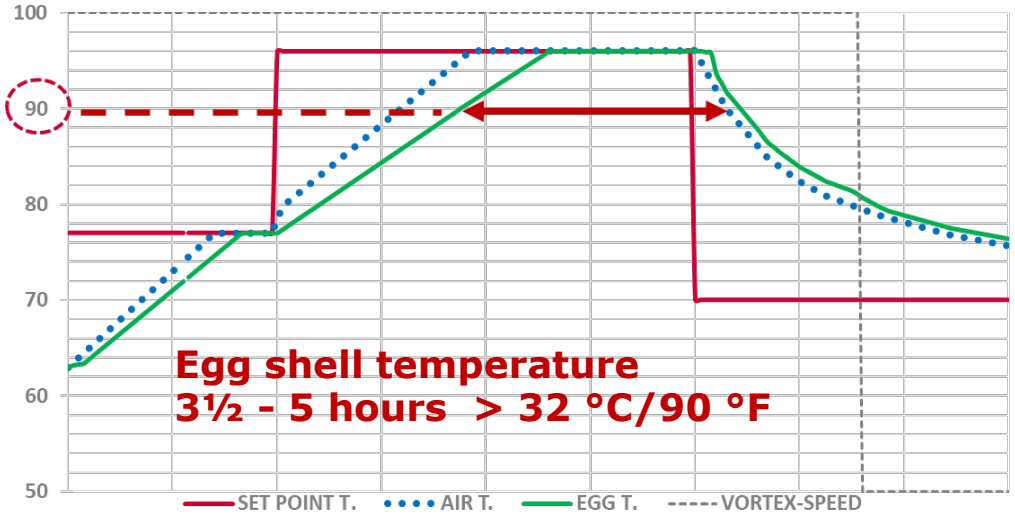
… but what if eggs have been stored for > 10 days?



Heating of eggs during storage

Aim: Minimize negative effect of egg storage

(Hatchability / Chick quality / **Incubation time**)



Implications for hatchery management

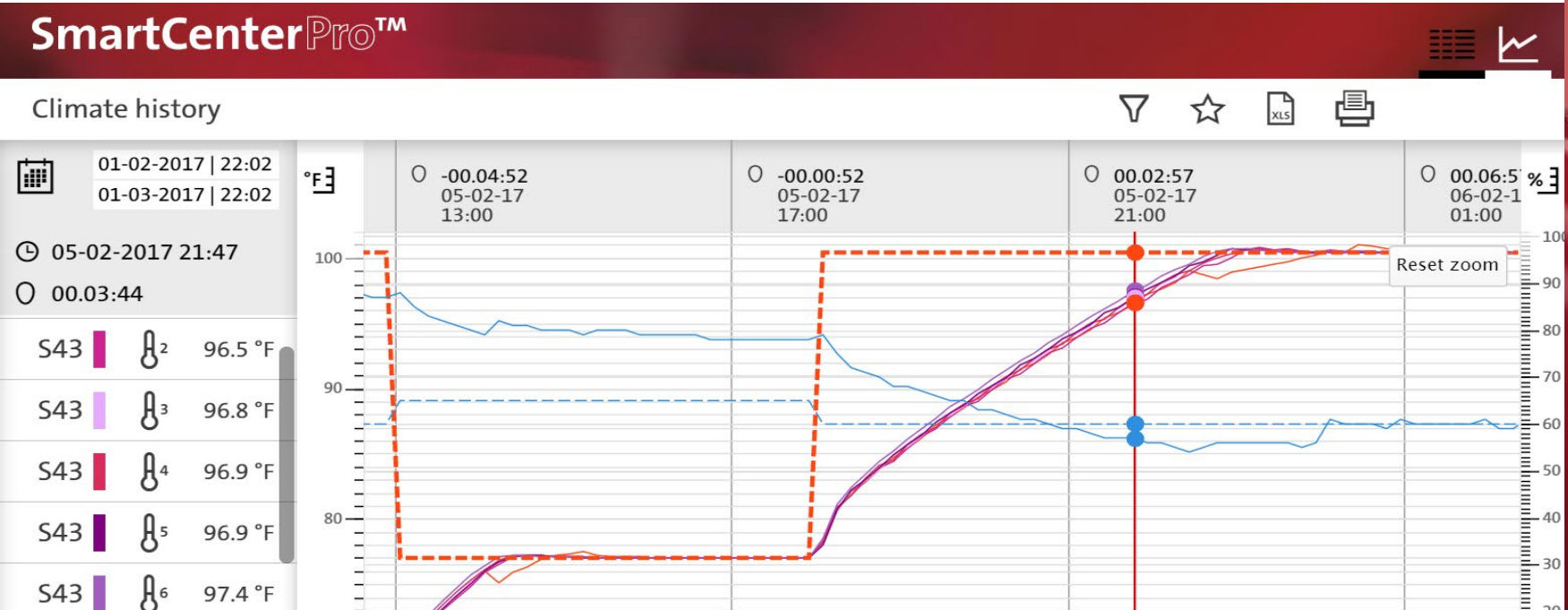
Uniform development in setter

Homogeneous incubation temperature

Implications for hatchery management

Uniform development in setter

Fast & uniform heat-up time → pre-heating



Implications for hatchery management

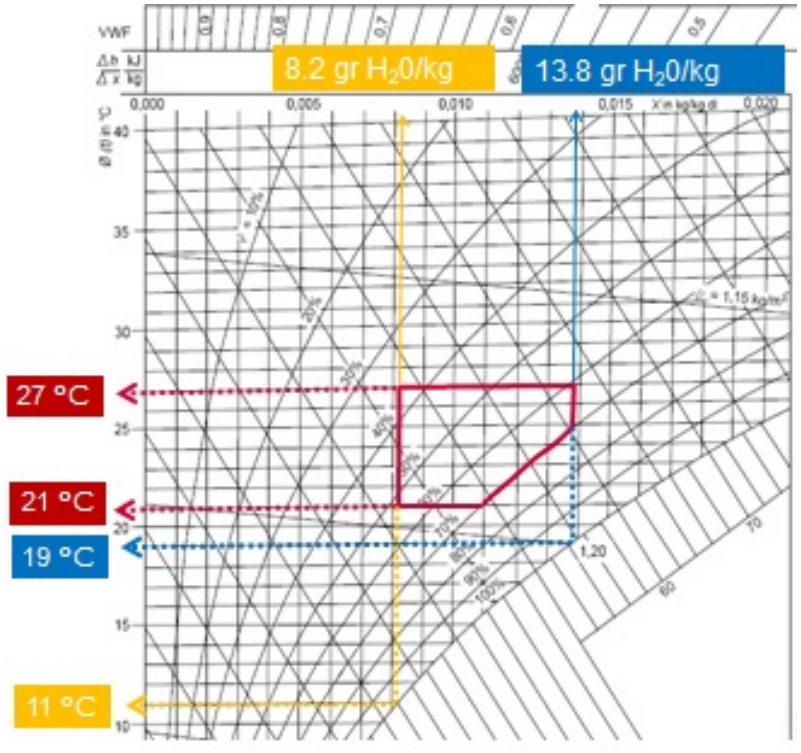
Uniform development in setter

Heating – cooling – air flow

Uniform development in setter

Minimize activity of humidifiers

= cold spot

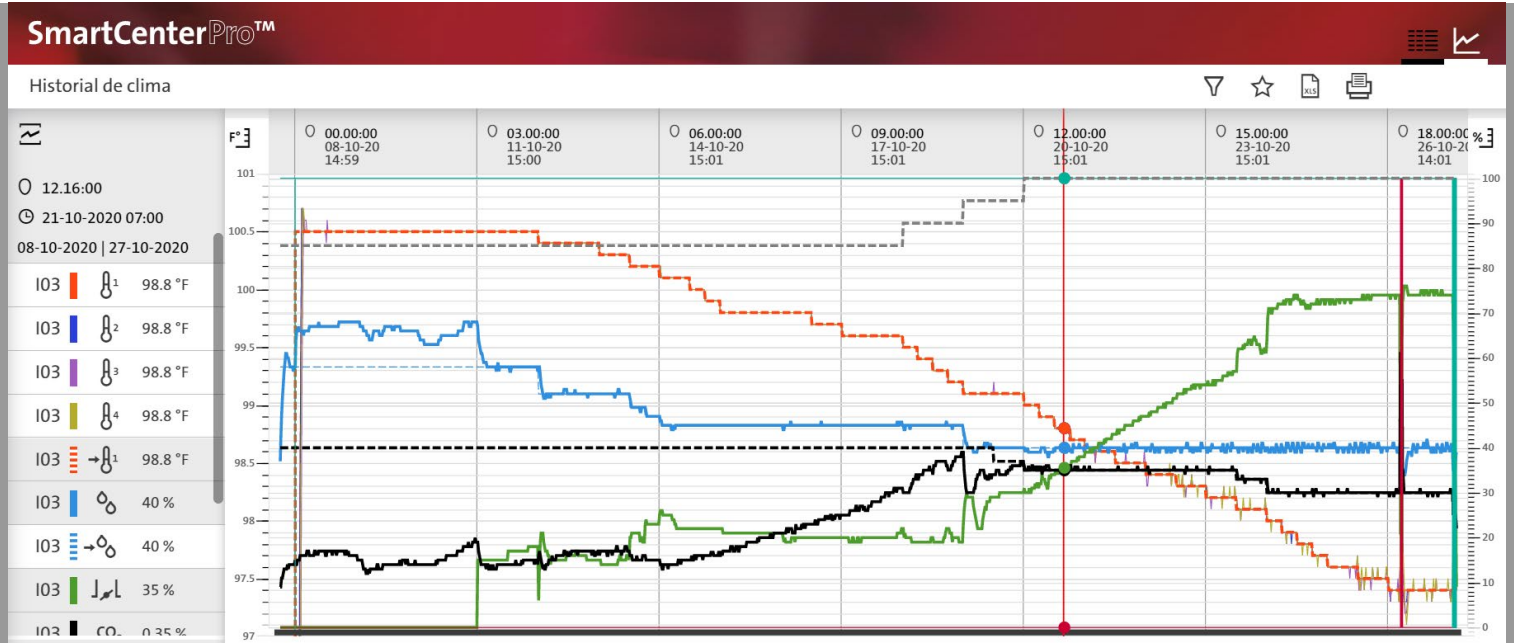


Climate requirements

Implications for hatchery management

Uniform development in setter

Incubation profile



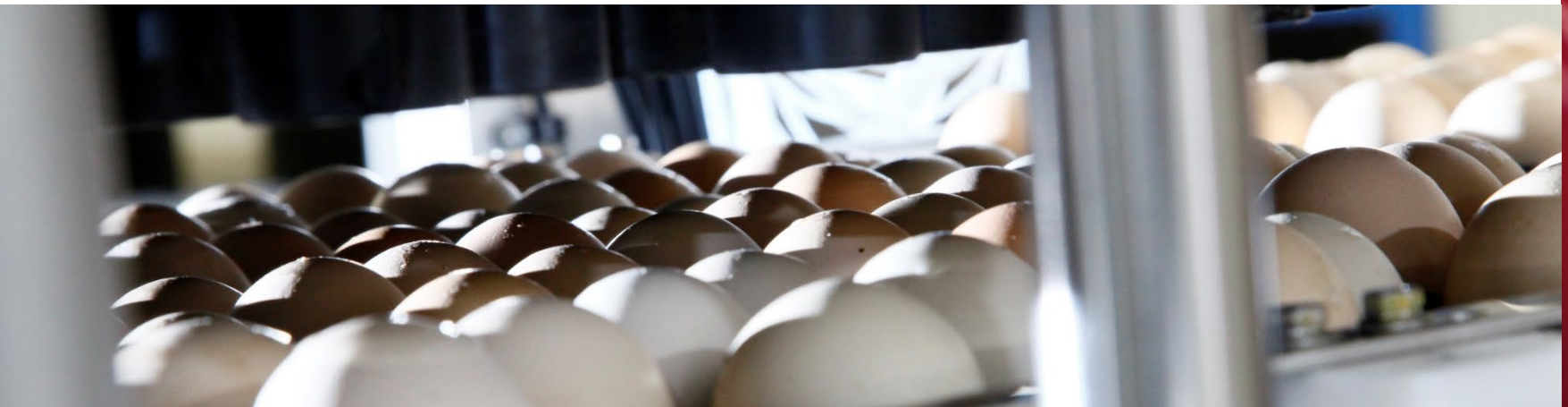
In-ovo vaccination

Summary

In-ovo vaccination

An excellent way of mass-application of vaccines to individual embryos for early disease protection

- Critical succes factors have to be taken seriously
- Hatchery management might have to be optimized



Hatchery Talks

Thanks for watching!

Webinar-replay + hand-out

Knowledge section at our website

See you at our next webinar