Hatchery Talks
Egg breakout analysis

Before we start …

- **Polls**
- **Questions in chat**
- **Webinar-replay + hand-out**

Content

- **Good hatchery results**
- **Hatchery calculations**
- **Egg breakout procedure**
- **Egg breakout interpretation**
- **Dealing with data**
- **Summary**

Hatchery Talks

Good hatchery results

What do you think is good?

- **High hatchability**
- **Good chick quality**
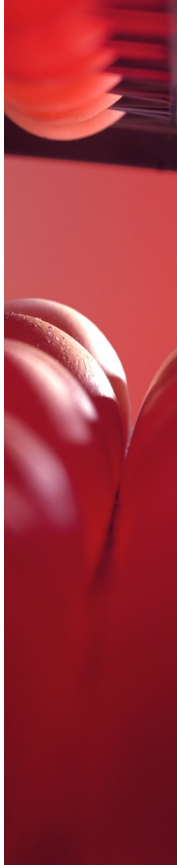- **Satisfied customers**
- **...**

Good hatchery results is your goal!

How to measure "High hatchability"?

- HOS% = 'hatch of eggs set'
- HOF% = 'hatch of fertile'
- DIS% = 'Dead-in-shell'
- ...

Good chick quality

- **% culls**
- **Pasgar©score**
- **Weight**
- **Chick yield**

Satisfied customers

- 1st week mortality
- 7-day body weight
- A silent telephone

Poll

"Are hatchery results always good? If not, how do you find out? "

Are hatchery results always good?

How do we find out when it is not good?

- **Reported problem** (by personnel or customer)
  - Unhatched eggs
  - Chick quality
- **Data-analysis**
  - down-ward trend
  - compared to standards
- **A visiting consultant**

Are hatchery results always good?

If not, find out first:

- Isolated incident or not?

Are hatchery results always good?

If not an incident, what is it related to?

- **Breeder flock**
- **Flock age**
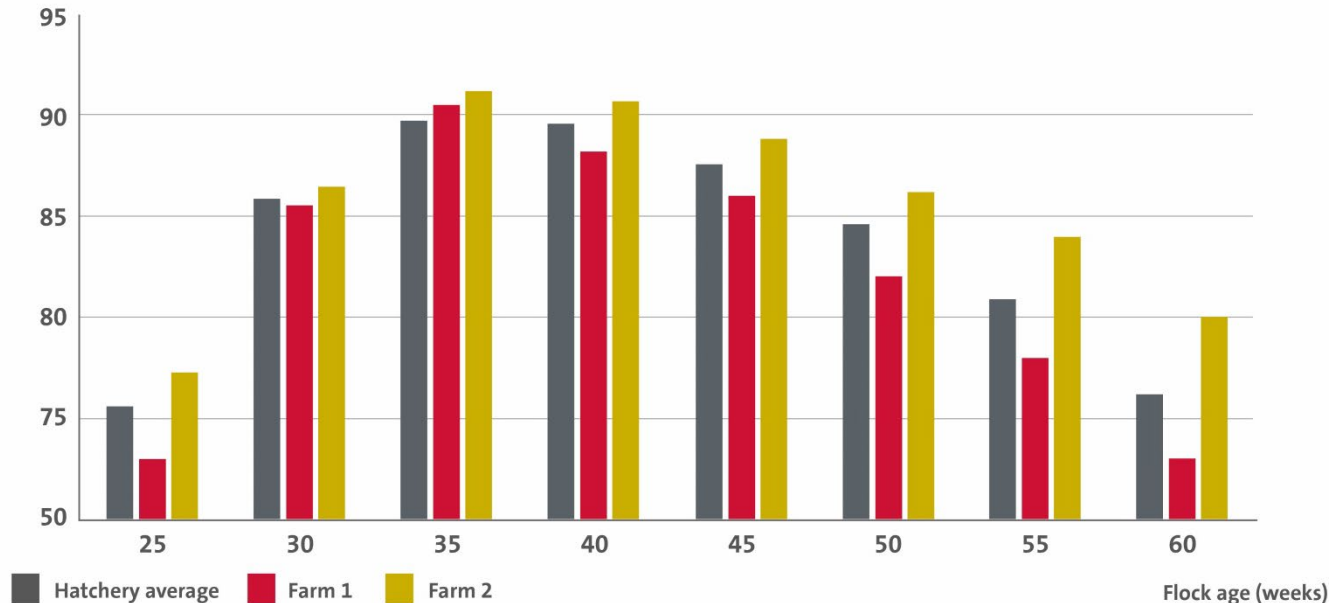- **Egg quality**
- **Egg storage**
- **Machine**
  – Setter
  – Hatcher

Data as reference

Hatchability of 2 breeder farms compared to overall hatchery average

Mean hatchability

Flock age (weeks)

Legend: ■ Hatchery average ■ Farm 1 ■ Farm 2

Visiting consultant

- **Regular visits?**
- **Blind spots**

Hatchery talks

Hatchery calculations

Hatchery calculations

Poll

"Can we rely on hatchery calculations, or do we need to do egg breakouts?"

Hatchery calculations reliable?

Example: Hatch of fertile

A. HOF% = 86/(100 – 9) * 100 = 94.5 %

Eggs set	"Clears"			1st class chicks	2nd class chicks	Total chicks
100	9			86	1	87

Hatchery calculations reliable?

Example: Hatch of fertile

A. HOF% = 86/(100 – 9) * 100 = 94.5 % = **HOT%**

B. HOF% = 86/(100 – 5) * 100 = 90.5 % = **HOF%**

Eggs set	"Clears"			1st class chicks	2nd class chicks	Total chicks
100	9			86	1	87
	Infertile	Early dead	Mid dead	**Breakout of "clears" required!**		
	5	3	1			

Hatchery calculations reliable?

Example: Hatch of transfer
Candling accuracy?

A. HOT% = 86/(100 – 9) * 100 = 94.5 %

B. HOT% = 86/(100 – 9 **+1**) * 100 = 95.5 %

Eggs set	"Clears"			1ˢᵗ class chicks	2ⁿᵈ class chicks	Total chicks
100	9 (+1)			86	1	87
	Infertile	Early dead	Mid dead			
	5	3	1 (+1)			

Hatchery calculations reliable?

Example: Dead in shell

A. DIS: 100 − 15 − (74 +1) = 10 %!

Eggs set	"Clears"	1st class chicks	2nd class chicks	Total chicks	Dead in shell		
100	15	74	1	75	10		

Hatchery calculations reliable?

Example: Dead in shell

A. DIS: $100 - 15 - (74 + 1) = 10\ \%$!

B. DIS: $100 - 15 - (74 + 1) - (5 + 6) = 4\%$

Eggs set	"Clears"	1st class chicks	2nd class chicks	Total chicks	Dead in shell		
100	15	74	1	75	10		
			Breakout of "DIS" required!		Clears	Mid	Late
					5	1	4

Hatchery Talks

Egg breakout procedure

Egg breakout procedure

Some aspects to consider:

- **How?**
- **When?**
- **What?**
- **How many?**

How?

- **Train your personnel**

- **Breakout done by the same people**

- **Random sampling from machine**
  - **Or conciously not random!**

- **Standard summary**

Poll

"What is the best timing to do a breakout to find infertiles?"

When?

- **On a routine basis:**
    - To obtain hatchery specific reference data
    - As an 'early warning'

- **In case of a problem:**
    - To find the cause and take correct action
    - To judge the effect of an action

What?

- **'Fresh' eggs**
  → Internal & embryo quality (+ fertility)

- **After 2-3-10 days of incubation**
  → true fertility

- **After candling**
  → fertility and mortality pattern

- **After hatch**
  → fertility and mortality pattern; other losses

How many?

- **As few as possible!**

- **Need to know from how many eggs set**
  - Opening clears & unhatched eggs without knowing the original number of eggs set does not make any sense.

How many?

Example: upside down tests

| 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

How many?

Example: upside down tests
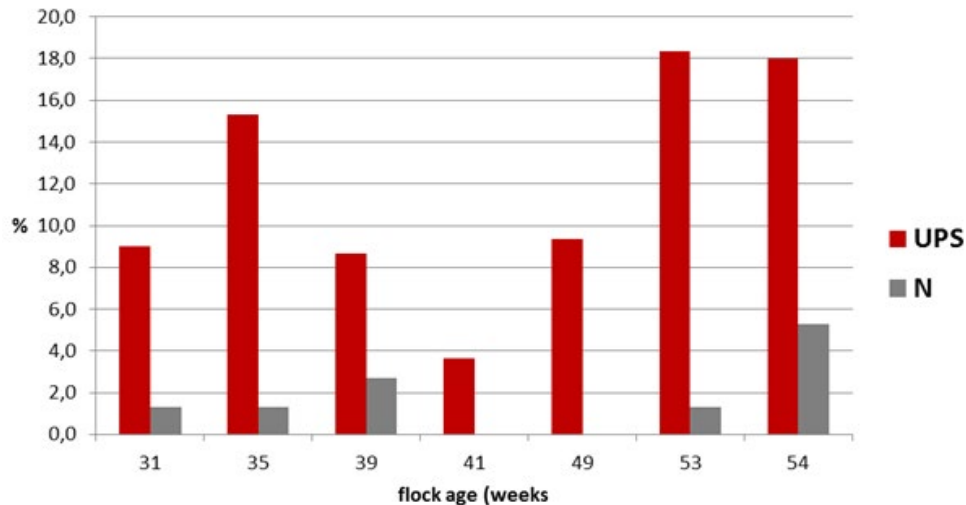
Mortality 18-21 UPS versus normal set eggs

How many?

Example: upside down tests

- Average difference was 16%
- Imagine setting 10% upside down -> 1.6% doesn't hatch
- On a 150 tray that is 2,4 eggs

Basket	1	2	3	4	5	6
# upside down	3	0	1	4	3	4

Egg breakout procedure

Tools

- Something to open eggs
- Empty egg trays
- Petridish
- Recording form
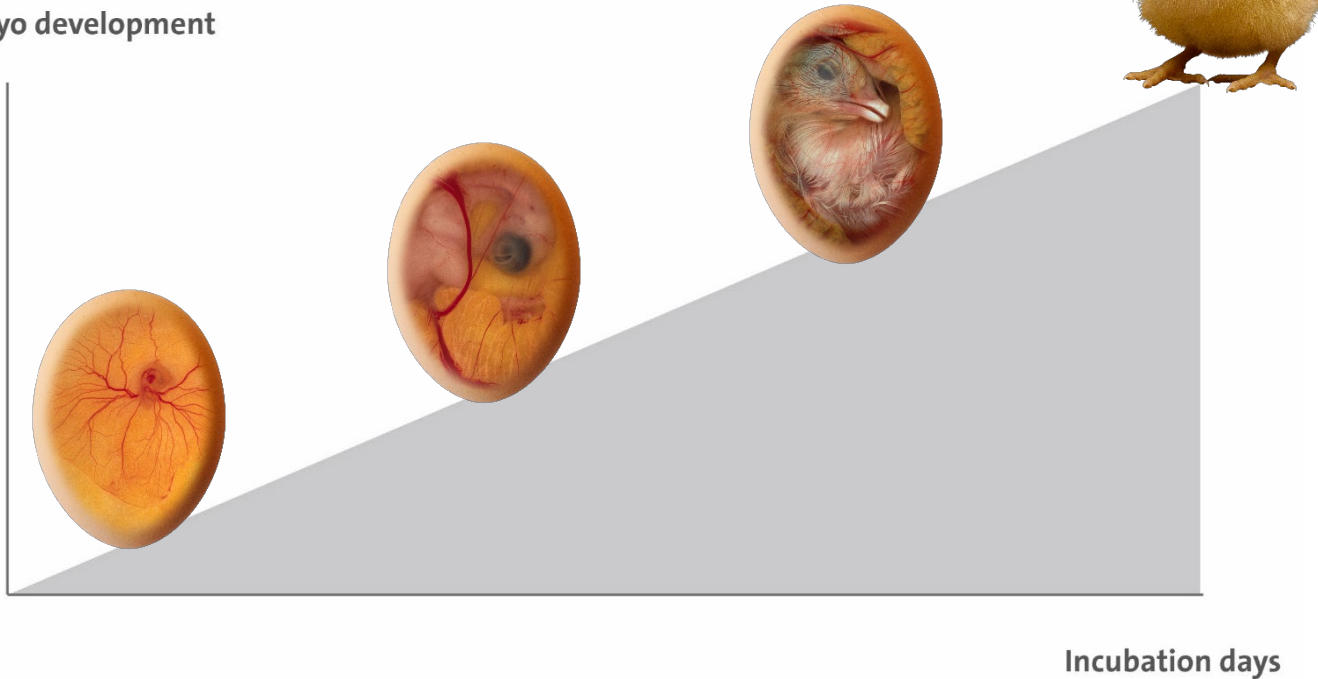- Tissues

Staging: a brief summary

- **Candling breakout looks very different from residue breakout**

- **Open at the air cell first**

- **Its not necessarily infertile if you don't find any signs of blood/bloodring!**

Staging: long story short

Embryo development

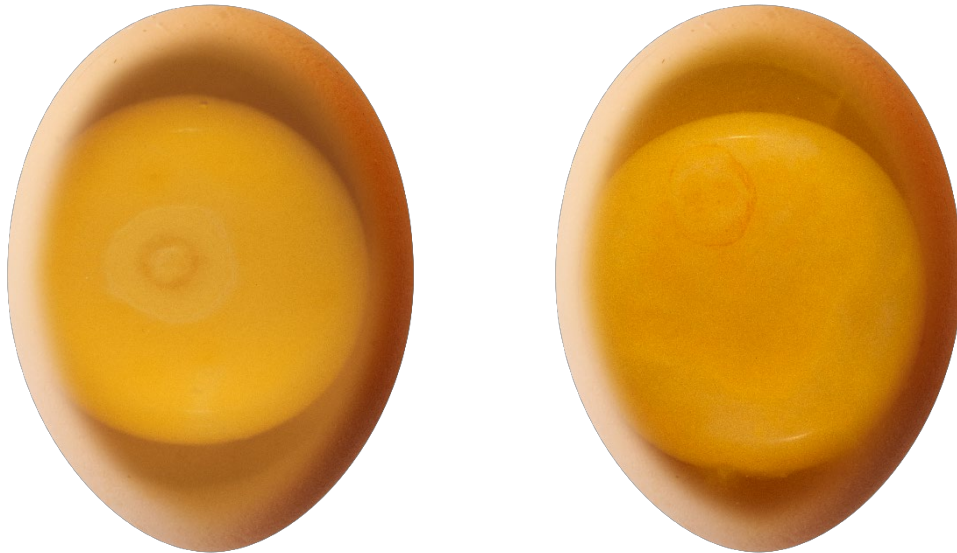Incubation days

Day 1 and 2

Sub-embryonic fluid formation is visible in the yolk

Day 3

Blood ring visible

Day 8

Egg tooth is visible
Upper and lower beak same lenght
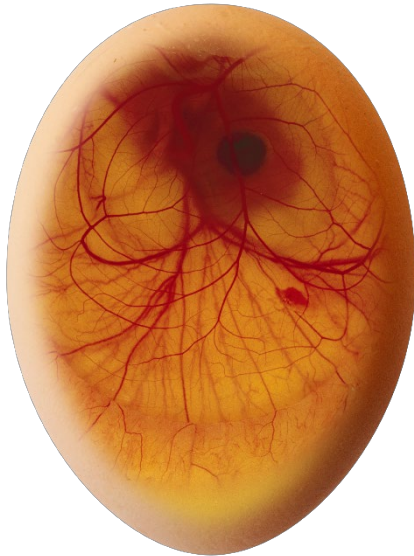
Day 14

Turning of embryo towards air cell
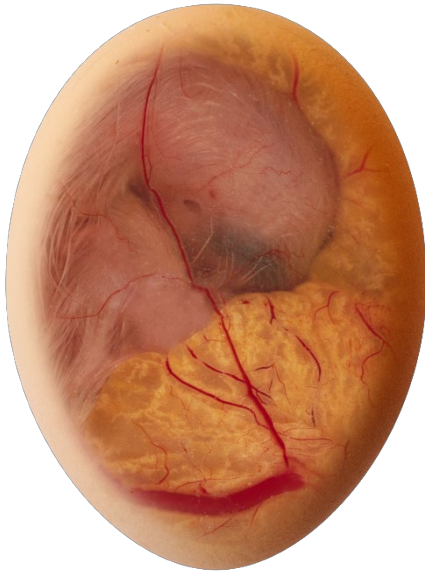
Day 18 and 19

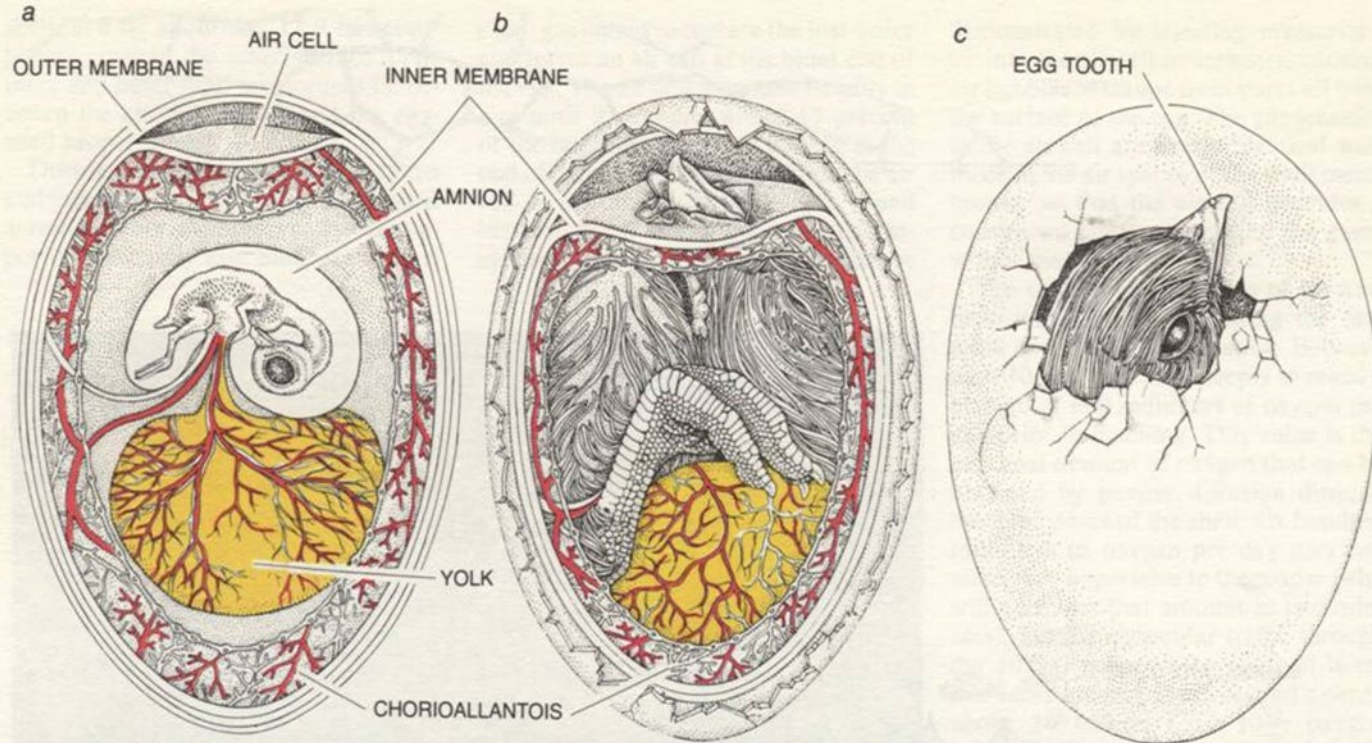## Head under right wing
Beak towards air cell
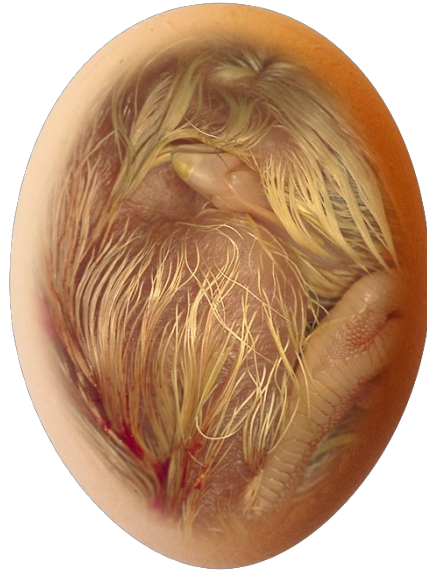
Setter or hatcher?
Difference mainly visible in yolc sac resoption

Hatching

Egg breakout procedure

Recording form

- **Early/ mid/ late**
- **More categories possible**

Recording Form 8G: Analysis of unhatched eggs

Start date of incubation cycle	

Egg ID-code		Breed	
Production date		Maternal age	
Setter number		Storage days	
Hatcher number			

Trolley					
Basket					
Total unhatched eggs					

Category		Number of eggs					Total % of eggs on trays
No.	Description						
1	Gaseous eggs / rots						
2	Cracks before/during setting						
3	Cracks during transfer						
4	Thin/porous egg shell (dehydrated)						
5	Not fertilised (irregular white spot)						
6	Died day 1 – 2 (membrane)						
7	Died day 3 – 4 (blood ring)						
8	Died day 5 – 7 (eye)						
9	Died day 8 – 10 (egg tooth)						
10	Died day 11 – 14 (feathers, embryo "floats/rests" on yolk)						
11	Died day 15 – 17 (embryo turned to length axis of egg)						
12	Died after 17 days (embryo dry; start yolk sac absorption)						
13	Internally pipped						
14	Externally pipped						
15	Dead chicks in tray						
16	2nd class chicks						
17	Abnormalities						

Fresh egg breakout

Evaluation of egg handling at breeder farm and storage

Recording Form 8C: Fertility and embryo quality upon receipt

| Category	Number of eggs within …	
	Sample of 10 eggs	Additional 20 eggs
Infertile		
Fertile, diameter approx. 3.5– 5 mm; doughnut-like opaque ring with translucent centre		
Fertile, embryo too small (≤ 3.5 mm); white dots in centre of opaque ring		
Fertile, embryo too big (> 5 mm)		
Fertile, abnormal embryo		

The unincubated fertile and infertile egg

Fertile

Fertile

Fertile, too far developed
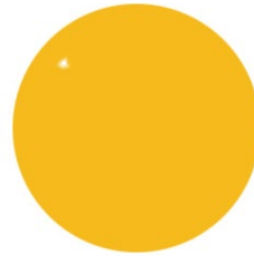
Infertile

Residue breakout

Interpretation by comparing with:

- 'Common sense': it's a problem if > 3 %
- Hatchery specific reference
- Standards of for example breeding company

Flock Age	Stage of Development of Embryo										
	Infertile	24 hours	48 hours	Blood Ring	Black Eye	Feathers	Turned/ Malposi-tioned	Pipped Air Cell	Pipped Shell	Cracked	Contam-inated
Young 25-30 weeks	6	1	2	2.5	1	1	1.5	1	1	0.5	0.5
Peak 31-45 weeks	2.5	0.5	1	2.0	0.5	0.5	1	1	0.5	0.5	0.5
Post Peak 46-50 weeks	5	0.5	1	2.5	1	0.5	1	1	0.5	0.5	0.5
Ageing 51-60 weeks	8	0.5	1	3.0	1	0.5	1.5	1	0.5	1	1

Courtesy of Aviagen

Cause?

Trouble shooting lists can point in the right direction

- Literature
- Royal Pas Reform incubation guide: Troubleshooting table
- Early: suboptimal egg storage, ununiform temperature, lack of turning
- Mid: suboptimal setter temperatures, nutrition of hen, contamination
- Late: transfer problems, suboptimal temperatures

Residue breakout

Correct interpretation of:

- **Rots**
- **Cracks**
  - Before setting
  - During transfer
- **Dehydrated eggs**

Not only quantitative!

Observe well and recognize malpositions

Not only quantitative!

Observe well and recognize abnormalities

- **Crossbeak**

- **More then 2 legs**

- **One eyed**

- **...**

Empty shells = information

Empty shells = information

Hatchery Talks

Dealing with data

How to store and analyse data?

On separate spreadsheets for each breakout

	A	B	C	D
1	date	27.04.2016 г.		
2	flock/age	Bresto/29 weeks		
3	date of laying	28-29,03,16		
4	fertility	97,83%		25~30седм.
5	number of trays	numer of eggs	%	standard
6	3	486		
7	unfertiled	11	2,26%	6,00%
8	1-5 day mortality	36	7,41%	5,50%
9	6-14 day mortality	18	3,70%	1,00%
10	mort after 14 day	19	4,32%	3,50%
11	malformations	2	0,41%	
12	piping	3	0,62%	1,00%
13	cracked		0,00%	0,50%
14	contaminated	3	0,62%	0,50%
15	total	92	19,01%	18,00%
16			80,99	

	A	B	C	D
1	date	27.04.2016 г.		
2	flock/age	Sushevo 2/38 weeks		
3	date of laying	28-30,03,16		
4	fertility	97,50%		31~45 weeks
5	number of trays	numer of eggs	%	standard
6	3	486		
7	unfertiled	7	1,44%	2,50%
8	1-5 day mortality	18	3,70%	3,50%
9	6-14 day mortality	10	2,06%	0,50%
10	mort after 14 day	11	2,26%	2,50%
11	malformations		0,00%	
12	piping	3	0,62%	0,50%
13	cracked	4	0,82%	0,50%
14	contaminated	1	0,21%	0,50%
15	total	54	11,11%	10,50%
16			88,89	

Continuous data table with all variables and values?

Hatchery Talks

Summary

Summary

- Hatchery results are not always good
- Hatchery calculations are not always reliable
- Breakout provides valuable extra information
- Breakout can be as extensive as you'd like

Thanks for watching!

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

See you at our next webinar!

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