WHY IS EGG TURNING IMPORTANT?

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- Inadequate turning impairs the development of the embryonic membranes and circulation. The chorioallantoic membrane, the area vasculosa, and the sub-embryonic fluid are all necessary for transporting water, nutrients, and respiratory gases within the egg.
- If eggs are left unturned, or the turning angle is too shallow, embryo development is impacted, reducing livability and hatchability. Chicks will be small, hatch late and their down will be sticky with unabsorbed albumen.
- Turning helps to direct and redirect airflow through the setter. In some designs, it can prevent hot spots from developing. In others, it can be helpful to level the trays towards the end of incubation to improve airflow over the eggs.

WHAT FACTORS ARE IMPORTANT FOR EGG TURNING?

- **Timing** – egg turning is needed from the day of set to day 15 of incubation.
- **Frequency** – eggs should be turned once an hour.
- **Angle** – eggs should be turned through 38-45 degrees from the horizontal at each turn.
- **Smoothness** – in the early stages of incubation, the embryo has very delicate blood vessels, which can be ruptured if the turning is not smooth.

PROCEDURE FOR CHECKING EGG TURNING – TURNING FREQUENCY

- **Step 1**: Watch the first full turn after a machine starts, and note whether or not the turning mechanism is operating smoothly and covering the full turning angle in both directions.
  - Many modern setters have automatic turning sensors. These are useful but not always completely reliable. Always perform visual checks as well.
- **Step 2**: During incubation, check each setter at least 3 times daily, noting the direction the trays are tilted. Look into the setter, checking every trolley and opening doors if necessary.
  - Keep the time between checks consistent and to an odd number of hours to ensure that the tilt alternates from left to right on successive checks.

Sample recording sheet showing a turning problem on day 3.

Setter Number	33			Hatch date	30th Aug 2023			Flocks			Levenhall, McArthur	
	Temperature Check				Humidity Check				Turning Check			Vent	
Day	Set	9am	12noon	3pm	Set	9am	12noon	3pm	9am	12noon	3pm	Set	Comments
1	100.2	100.1	100.1	100.2	75	73.0	76.0	78.0	\	/	\	0	
2	100.2	100.1	100.3	100.2	75	77.0	80.0	79.0	\	/	\	0	
3	100.0	100.0	100.0	100.1	75	80.0	79.0	77.0	/	/	/	0	turning checked and restarted 3pm
4	99.8				75							0	
5	99.8				75							0	
6	99.6				75							0	
7	99.6				75							0	
8	99.5				75							0	
9	99.5				75							0	
10	99.4				55							20	
11	99.4				55							20	
12	99.3				55							20	
13	99.3				50							40	
14	99.2				50							40	
15	99.2				48							60	
16	99.0				48							60	
17	99.0				44							80	
18	99.0				44							80	

Pre-setting checks		
Fan belt okay	✓	Dan
Heater bars okay	✓	Dan
Humidity nozzles clean	✓	Dan
Drip check	✓	Dan
Turning working	✓	Dan
Alarm working	✓	Dan
Clean & disinfected	✓	Dan
Humidity sensor cover off	✓	Dan
Door thermometer check	✓	Bob

PROCEDURE FOR CHECKING EGG TURNING - TURNING ANGLE

- **Step 1**: Check the turning angle in loaded setters regularly as part of routine setter monitoring.
- **Step 2**: Check turning angles using an angle meter or a suitable app on a mobile phone.
    - Use the plastic setter tray as a baseline, not the metal carrier; they can differ. It is important to make sure that what is measured is what the eggs experience.
- **Step 3**: Place your chosen recording device onto a loaded middle tray in each setter trolley, read the turning angle, and move the angle meter away.
- **Step 4**: Use the setter's turning mechanism to move the trays to the opposite tilt direction and measure again, as they may not be the same. Do not move the trays by hand.
- **Step 5**: Measure the turning angle again, and record the data.

Measuring turning angle with a dial and a digital meter.


Measuring turning angles using an app such as Angle Meter Pro.

Note: *Turning angles tend to drift over time; because the drift is usually gradual, it can be difficult to spot unless it is measured regularly and records are kept.*

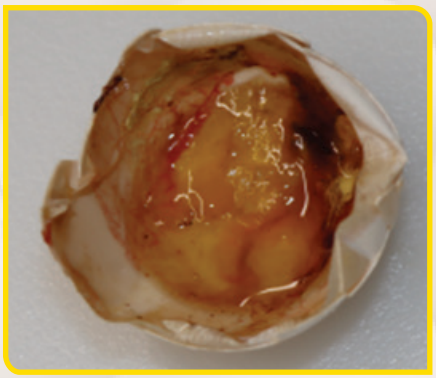
Turning angle record.

Turning Angle Measurement					
Hatchery: Sunnybank Hatchery					
Date	**Setter No**	**Position in machine**	**Angle Left**	**Angle Right**	**Action Taken**
25th June	15	left side front row left trolley	45	43	OK
25th June	15	left side front row centre trolley	45	45	OK
25th June	15	left side front row right trolley	38	38	Just OK
25th June	15	left side 2nd row left trolley	44	42	OK
25th June	15	left side 2nd row centre trolley	43	41	OK
25th June	15	left side 2nd row right trolley	32	34	Check turning mechanism - turning bars bent

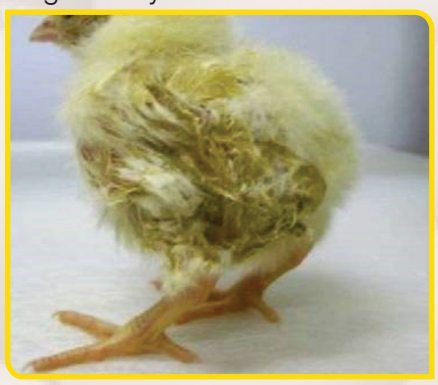
SIGNS OF TURNING INADEQUACY

- Increased early embryo mortality when a turning problem occurs between 0 and 7 days of incubation.
- Increased late embryo mortality for problems between egg set and day 15.
- Failure of the chorioallantoic membrane (CAM) to completely enclose the albumen, leaving a patch bare of blood vessels in the small end of the egg, lumps of unabsorbed albumen in late dead embryos and sticky patches on hatched chicks.
- Increased frequency of malpositions, especially Malposition 2, embryo upsidedown.

CAM incomplete in small end of the egg.



Unabsorbed albumen in late stage embryos.



Unabsorbed albumen causing sticky down in hatched chick.

Malposition II, chick upside down.

POSSIBLE CAUSES - NO TURNING

If turning fails at start-up, after eggs are set, or consecutive observations during incubation show trays tilted the same way, there may be a turning problem. Activate the turning mechanism immediately to see if it is working. If not, check the following possible causes:

- The trolley is not fully engaged with the turning mechanism.
- The trolley wheels are worn, preventing the turning mechanism from aligning properly.
- Turning sensor failure.
- Software failure or incorrect programming.
- There is no air or power to the device.
- Faulty turning device.

POSSIBLE CAUSES - TURNING ANGLE INCORRECT

Turning angles below 38 degrees are too low. Possible causes include:

- Bent turning bars (usually larger machines).
- Wear and tear on the turning mechanism.
- Low air pressure to compressed air-driven turning mechanism.
- Machines are modified in a way that there is no space for the full turning angle.
- If angles are less than 38 degrees, and cannot be adjusted, increasing the turning frequency to more than once an hour (up to 3 times an hour) can limit some losses, but not all. However, the rate of breakdowns and the need for repairs to the turning systems will increase proportionally.

ADDITIONAL INFORMATION

Hatchery Tip – ***When did you last watch your eggs turning?***

Hatchery Tip – ***Check hatch debris regularly to identify egg-turning problems***

Hatchery Tip – ***Using your mobile as a powerful tool in the hatchery***

ANAVS Q3 – Episode 5 –
https://youtu.be/a1dWho7IuBQ?list=PLYdqV8aXjcPUfJf4KBmxViZMMW82aHkEM

