A twist on turning

By Ron Meijerhof

Turning of the eggs is a very critical item during incubation. Failing to turn in the first week of incubation will result in a poor hatchability and a poor chick quality. Turning is essential for the formation of the extra-embryonic membranes and for the orientation and position of the embryo, and with that for the development and growth. Without proper turning, the embryo will not be able to take up the essential nutrition from the egg. This often shows in developmental problems later on. As the embryo is not able to take up sufficient nutrients, it sometimes will die at a later stage, when the need of turning is by itself not there anymore.

Most modern setters turn once every hour continuously throughout the complete period in the setters. In older days when turning was done by hand, a frequency of turning every 4 hours was often applied. Although more frequent turning proved to be beneficial, this low frequency of turning worked by itself quite well.

Research has shown that there is a slight benefit of turning more frequently than once an hour, especially in the first days of the incubation process. The reason for this benefit is not totally clear, but could well have to do with the distribution of air and heat. More frequent turning will allow the eggs to warm up more uniform, as the direction of the air on the trolleys will be changed more frequently.

After this initial warming period, turning once an hour seems to be sufficient for optimal results, but it is quite important to turn the eggs over a steep enough angle. Optimal is to turn the eggs to both sides over an angle of 45 degrees. However, a steep turning angle limits the air flow over the eggs, as the trays will be more close together in a turned positon. As air flow is important for heat transfer, a limited air flow will result in more overheated eggs, which will have a negative influence on the incubation results.

Although turning is important at the start of incubation, it is not needed to turn for the complete 18 days. After day 13-14, there is no problem to stop the turning and put the trays in a horizontal position. The benefit is that in some machines it will increase the air flow over the eggs, and with it the heat transfer. In this way we can better remove the heat from the eggs and prevent overheating. When turning is stopped, the trays should be placed in a horizontal position. Leaving them in a turned position will result in local overheating, as the air distribution will not be uniform.

Most incubators do not turn to both sides over the whole 45 degree angle, to prevent limiting the air flow but also to allow bigger eggs in the trays without crushing them by the upper tray. Although 45 degrees turning angles are preferable, the negative effect of turning on a lesser angle is limited, as long as the angle is 38 degrees or more. Turning at angles below 38 degrees will influence the results negatively. Turning should be to both side over 38 degrees or more, turning over one side to 45 degrees and the other side to 31 degree will not work so well as turning both sides over 38 degrees.

Although turning angles in most machines are taken for granted, it is a good practice to once in a while check if the turning angles are still up to standard. Sometimes we see after a number of years that trolleys or machines are not turning that easily anymore, resulting in a too low turning angle, below the minimum required level.

Failing to turn, not turning frequently enough or not turning over a large enough angle can result in serious problems. It can result in both early and late mortality, and will show in malformations, small embryos, malpositions etc. However, a first indication of problems that can be related to turning is the number of embryos with the head under the left wing. The normal position of an embryo at the end of the incubation process is with its head under the right wing. When the head is not under the wing but on top of the right wing, this is a typical sign of overheating. But when the head is under the left wing instead of the right wing, it might be that we are dealing with a system where the turning angle is not steep enough. When we see more of these malpositions occurring during our break out procedures, a check on the turning angle of the trolleys might be necessary.