

OPERATING A MULTISTAGE SETTER USING HUMIDITY CONTROLLED DAMPERS

Traditionally, temperature has been regarded as the key to incubation while humidity levels within the machine were of secondary importance. Whether the advice came from hatchery operators or incubator suppliers, it was almost always the same. Control your temperature. It should come as no surprise then that the majority of hatcheries in the world are running their setters and hatchers with temperature set points controlling ventilation practice in the unit.

Another important historical principal to remember is the old theory that "air is free". Because of this frequently erroneous theory most incubators have been designed to operate with a high percentage of the internal cooling coming from fresh air that is introduced into the setter/hatcher chamber. Three factors contribute to the general acceptance of that theory.

1. There is a basic amount of fresh air that must be introduced to the setter or hatcher in order to remove carbon dioxide that is being released by the embryos and/or chicks and replace it with oxygen;
2. There is a basic amount of air that must be introduced at a humidity level below the humidity setpoint in order to remove the excess water being released from the albumen through the egg pores in order to remove most of the excess water content before hatch time.
3. In virtually every hatchery in the world there are at least a few weeks or months when the outside air is just about the correct temperature for use and is absolutely free!

At least on the surface of it, *free* is a good thing! That is, if it's really free meaning without costs attached.

The incubators offered commercially subscribed to the above theories to some degree, although the extent of the subscription varied within manufacturers. Some totally eliminated water cooling other than that generated by the latent cooling coming from the introduction of humidity spray; others, like Chick Master, believed that some level of cooling from recirculated liquids was critical to performance in warm, high humidity markets. However, even in the case

of Chick Master the assumption was that at least 60% of the cooling required would be supplied by the air circulation and the humidification sprays. As a consequence of those decisions, no incubators could be allowed to stop most and in some cases any of the airflow through the setter. The setters simply couldn't handle the heat load even in the most basic of multistage setters.

The situation became more problematical as the high yield, larger strains of birds were introduced to the poultry industry. Average egg sizes increased by (depending upon who you are talking to!) up to 15 grams over a few short years. Fertility improved. Egg handling procedures improved, storage conditions were made more consistent. All of these things contributed to a dramatic increase in the heat load on setters and hatches.

Then came single stage setting. Instead of having 6 sets of ages at varying degrees of development, the setter was faced with the entire set generating maximum heat load at the same time. Buckeye Incubators (acquired by Chick Master in 1998) faced this challenge in the early 1980's - so they began to experiment with greater water cooling capacity in the setter.

The lessons learned in those early days logically led to the changes that are found in the current generation incubators supplied by Chick Master. These incubators have a far greater water-cooling capacity than any setters produced before as recently as 2002. This increased cooling potential considerably reduces the air-cooling requirement. It does not attempt to eliminate that requirement since the far more important purpose — of supplying oxygen to the embryo while removing and carbon dioxide (CO₂) — continues to set the minimum standard for air change inside the setter cabinet.

However, current generation Chick Master equipment on average comes equipped with enough heat transfer capability to allow all of the cooling to be done by a combination of minimum air flow and water cooling.

There is no requirement in today's Chick Master setter to run

To Our Hatchery Friends:

This is the first of the new format Chick Master information letter. We are distributing it to all of our customers, associates and suppliers in the poultry industry who have given their email addresses to us over the past few years.

We believe you will find this new format useful, informative and easy to read. For instance, this issue contains:

- Information about the benefits of and procedures for running your setters using humidity control rather than temperature control;
- Information about our upcoming Open House (September 14 and 15 in Medina, Ohio, USA)
- NO product advertisements - just our HOOCHO bird!

Our intent is to send these information-only newsletters to our email friends every 6 weeks or so. We know you are busy - we do not wish to use your time unwisely. If you do not want to receive this information, please take a moment to reply to this email asking to be removed from the mailing list.

Thank you for your time this time and for your business and goodwill at all times.

Best regards,
Your Friends at Chick Master

humidity spray for cooling purposes nor is there any reason to run volumes of air in excess of that needed for gaseous exchange. Think about that for a moment. If you do not run humidity spray, we all know the temperature in the setter will remain more stable and the dangers of egg-wetting are virtually eliminated. If you do not run excessive amounts of air through the setter, you do not remove excessive amounts of moisture so there is no need to turn on humidity spray to increase humidity levels. Bottom line tighter hatch, higher hatch of fertile, better finished chicks!

We should also think for a moment about the removal of CO₂ from the setter. There has been much written about CO₂ and the importance of CO₂ in the incubational process. Most of that information centers around the single stage incubation process. Theory suggests and field data confirms that enriched levels of CO₂ concentration within the setter environment greatly improves embryo development. This is particularly true in the first 6 days of embryo development.

Continued on page 2

OPERATING A MULTISTAGE SETTER USING HUMIDITY CONTROLLED DAMPERS

The issue that continues to be understated, however, is the beneficial aspect that the environment of higher CO₂ levels creates higher and more consistent levels of humidity. A damper controlled by humidity will have similar effects to the environment as does a damper and control using a CO₂ sensor. This is especially valuable in multistage setters since the older eggs provide a ready source of CO₂ free. Higher levels of CO₂ in the late stages of incubation are not harmful to embryos that have been introduced that higher level early in their development.

Now, back to the issue of humidity. Humidity in an incubator is not only important to control weight loss but also equally important to increase the heat capacity of the incubator environment. Reduced air intake to the incubator produces an environment of greater temperature stability. Higher humidity promotes more even distribution of heat within an area. Consequently, temperature variations within the cabinet will be significantly reduced.

The traditional approach to controlling the damper position - using the temperature of the incubator as the priority parameter - will move the damper position to be, on average, between 90% and 100% open. While this provides the virtual maximum amount of air-cooling, it makes no adjustment to the damper position intended to assist in increasing the humidity level within the machine. This is not to suggest that the incubator will be unable to reach the humidity set-point eventually, but at what cost to the environment within the machine?

Chick Master over the last few years and through trial work and experience has gained a much better understanding to the requirements of the incubation environment. It became evident that the "ideal environment" has been neglected for many years.

So, let's summarize what all this means:

What are the consequences of operating an incubator with temperature control?

- Large volumes of intake air causes larger variations in temperature within machine environment;

- Hatch is effected, with wider than desirable hatch window and lower chick quality;
- High energy costs to heat, cool and/or condition incoming air;
- Room humidification may be essential. High energy cost steam for example;
- High demand on inefficient and potentially harmful machine humidification systems;
- Possible "wetting of eggs" causes both egg chilling and overheating.

Why should I run my multistage machine with humidity control on damper?

- Reduced air intake = improved machine environment and reduced temperature variations;
- Hatch improvement from tighter hatch window which provides better chick quality;
- Reduced energy costs for the heating and conditioning of incoming air;
- Room humidity may not be required due to greatly reduced machine humidification demands;
- Reduction and possible elimination of the risk of egg wetting.

If I operate my machine using humidity control on damper how will it operate?

All Genesis II, III and IV control systems have the ability to define a minimum damper position. This minimum damper position is typically 10%. That defines the absolute minimum position that the damper is able to close to. However, that minimum can be further reduced if the CO₂ controlled damper option is chosen. (Without that option it is somewhat "risky" to allow the damper to close completely since the malfunction of the humidity sensor could be damaging to the hatch!). The damper will react to the information supplied to the control system by evaluating the humidity level and the amount of cooling that the machine has done over the previous two minutes. The damper will then open or close by a 5% increment and will carry out this cycle every two minutes.

As a point of reference, a multistage setter with fertility of 95% and at the point just before a transfer will require

approximately 0.9 CFM/1000 eggs to control the CO₂ level to 0.6%. At other times the air requirement is less.

Each time a machine is set, the opening of the doors releases the moisture within the machine. Soon after the fresh eggs are set the damper will shut to its minimum position in order to build the humidity. As the setter progresses through to the point of the next transfer (once the humidity is up to the set-point) the more predominant cooling activity will start to open the damper. This cycle continues with the machine constantly evaluating the level of humidity within the machine in comparison with the cooling demand. Although the moisture level within the machines takes priority, the damper will open on cooling once the humidity is up to set-point.

The important issue to keep in mind during all of this activity is that water cooling will be working in conjunction with the damper to keep the machine cool while maintaining the appropriate humidity level!!!

How do I set my Genesis control system to operate in this damper mode?

To change the damper mode in the Genesis II or III series is simple. All that needs to be done is to enter the maintenance mode on the control screen and select "humidity control" on the damper screen. For the Genesis IV system, select "Humidity control" for the damper and "Water only cooling".

Can I control the damper with humidity on older Chick Master Setters?

We are able to offer a firmware upgrade to facilitate this operation for Ultra controls as well as the Genesis Millennium series. Unfortunately, this system is not available for older type control systems. However, most Chick Master setters can be upgraded to these new, more advanced controls.

What's "The Bottom Line"???

Controlling setter dampers based on humidity rather than temperature has many significant benefits. They include:

- Reduction of energy costs
- Reduction of load on ventilation systems

Miss the last one?



Don't miss THIS one!

We invite you to attend our Open House

**September 14th and 15th, 2005
Medina, Ohio, U.S.A**

Once again Chick Master will host an open house for friends in the poultry industry. Like the 2003 event, this open house will feature presentations on technique and technology that you can't afford to miss. You'll leave with practical information that you can put to use in your own hatchery—immediately!!

The early registration fee of \$250 covers meals, two hotel nights, and local transportation including pick up and return to the Cleveland airport between the hours of 8:00 AM and 8:00 PM on Tuesday and Thursday.

All registrations are subject to space availability.
Registration fee after July 1, 2005 will be \$350.

Chick Master Inc. 25 Rockwood Place, Englewood, New Jersey 07631, USA.
Phone: (201) 871-8810 x106 (Patricia) Fax: (201) 871-8814 Email: pmontane@chickmaster.com
www.chickmaster.com

We look forward to seeing you in September!

For a Registration Form please contact Patricia Montane (details above) or visit our website

www.chickmaster.com

Register Now - Space is Limited!

Please contact us for any product or support information you may require

North American, South American and Middle East Sales: 25 Rockwood Place, Englewood, New Jersey 07631 USA
Phone: (201) 871-8810, Fax: (201) 871-8814, Email: sales@chickmaster.com

Europe, Asia, Africa and Oceania Sales: Chick Master UK, Express Park, Bristol Road, Bridgwater, Somerset TA6 4RN. UK.
Tel: +44 (0)1278 411000 Fax: +44 (0)1278 451213 E-mail: sales@chickmasteruk.com

OPERATING A MULTISTAGE SETTER USING HUMIDITY CONTROLLED DAMPERS (continued)

- Definite reduction on sensible load on chillers and potential overall reduction of load on chillers
- Reduced maintenance costs
- Improved hatch percentage
- Improved chick quality
- Meaningful reduction in cost per chick statistics!!

Finally, will you HOOCHO?

We at Chick Master are strong advocates of running setters and hatchers with reduced air intake and more emphasis on water cooling. Our experiences and trials have proven very significant benefits on reduced energy costs and improved chick quality from using this approach. Remember, the damper will still react to air cooling requirements and the damper will find a balanced position in consideration of both moisture levels and air cooling requirements. You are not putting your birds at any greater risk of overheating through this approach ☺

Do you...

HOOCHO?

