

AUGUST 2005

Issue Number 2

Open  House

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

**SPACE and TIME
are both running out.**

If you haven't registered for the Chick Master Open House
on September 14 and 15 in Medina, Ohio,
you need to act

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~~40~~ We have
21 spaces left!

Among the topics likely to be presented during the two intensive days are:

- Energy Recovery in a Hatchery • Hatchery Audit Procedures
- Adjusting to Changing Conditions of Eggs and Environment
- HOOCHO Intelligent Management of Humidity and Carbon Dioxide
- Improving Hatchery Performance without Spending a Fortune!
- Tools to Help Manage the Hatchery Process
- Single Stage Setting - An Evolving Process
- What's New at Chick Master! • Controls and Control Upgrades
- The Latest in Hatchery Alarm Systems
- Multistage Roll-In Setters Take a Giant Step Forward

SIGN UP NOW. NOT TOMORROW. NOW.**REGISTRATION FEE \$350!!****GeM
is here!****Formaldehyde
Monitoring****CO₂
Injection****Buy trays and
baskets now!**

For a Registration Form please visit our website
www.chickmaster.com

To Our Hatchery Friends:

This is the second of the new format Chick Master e-News. It is exciting to receive so many positive comments after publication of our first issue. It brought home to us how many of you really want good quality information on the latest trends in the amazing, and rapidly changing world of poultry incubation. So much has changed over such a short time that many customers and hatchery friends alike are excited to learn much more about topics such as Humidity Controlled Dampers and CO₂ Enhancement in Multi Stage Incubators, and CO₂ Injection in Single Stage Systems.

Over the coming months we will endeavour to keep you informed by way of in-depth articles, trade shows, and seminars in locations worldwide. The next seminar is the Open House that we are holding at our facility in Medina, Ohio USA on the 14th and 15th September (see opposite).

**There is still time to register but
please, be quick!**

If you know somebody that would like to be on our E-news mailing list please let us know by taking a moment to reply to this email.

Thank you for the time you took to read this and for your business and goodwill at all times.

Best regards,
Your Friends at Chick Master

The Case For Single Stage Incubation
Please scroll to pages 2, 3 and 4

THE CASE FOR SINGLE STAGE INCUBATION

Chick Master has been involved in numerous test situations over the past years where it has had the opportunity to compare results from various control processes against the results obtained from single stage equipment. Due to the many variables which can significantly skew the result of any small test, we have chosen not to publish individual trial results, but rather to provide our customers with the overall statistical results coming from approximately 30 million eggs at the time of this writing. We believe we have reached a point where we have enough conclusive evidence about the many pluses and the occasional yet significant minuses of this process that we should share these findings with our customers and potential future customers.



Loading a Chick Master Avida 12 single stage setter

By way of brief background, the single stage system refers to the process of filling a setter with eggs all of the same approximate age. It would be more accurate to state that these eggs are all of virtually the same point in their incubation process, even if some of the eggs may be chronologically several days or even a week older than others. The important issue is that all of the eggs have been stored in a manner that ensures that the incubation process has not progressed significantly further in any of the eggs than it has in the least developed egg. The primary advantage to this grouping of eggs that are

virtually identical in their progress through the development cycle is that all of the embryos are in need of the same environmental conditions. This differs significantly from multi stage conditions which attempt to maintain the setter conditions at the average temperature and humidity called for by the overall needs of newly set eggs ranging up to eggs reaching the point of transfer to the hatcher.

At first thought one might be fooled into thinking the single stage process is much simpler than the multi stage process since the entire setter's contents are all seeking the same environment. Experience has proven that the exact opposite is true if your objective is to obtain the maximum performance that proper cost/benefit decision making dictates. The single stage process can be far more complex and demanding upon both the equipment and its operators if the goal is maximum hatch, superior chicks and maximum return on investment. Ah, the rewards that this process can bring! Let's review the two processes in more detail to understand first why the single stage process can be so complex.

For many, many years the standard of simplicity and successful performance under virtually any set of conditions has been the Chick Master Fixed Rack setter (the "Classic"). This setter has columns of tray frames fixed in position so the spacing of the egg trays is consistent and the positioning of hot, warm, cool and cold eggs is easily planned to minimize the need to externally alter the environment. Hot eggs heat the cold eggs and the energy absorbed by the cold eggs helps to keep the hot eggs from overheating. The humidity given off by the hotter eggs keeps the environment moist, so the demands on the humidification system are never severe. The proximity of different ages of eggs to one another means that the air system does not have to move huge volumes of air to ensure a good mix of warm and cool air. As a result, the Chick Master rack machine outperformed all of its competitors in virtually every imaginable climatic condition.

The multi stage roll-in attempted to keep the advantages of the Chick Master rack while eliminating its primary drawbacks the need for humans to work for fairly long periods in a warm and humid environment and the difficulty of cleaning the entire box at one time. While some of the roll-in machines achieved successes, none has ever been able to consistently approach the production of the rack machine. The "why" is very simple. The roll-in equipment placed large blocks of cold eggs together and placed those blocks next to warm or hot eggs. While this mimics the rack system concept, the density of the egg blocks meant that hours could pass between the time eggs on the outside of the trolley began the incubation process and eggs on the inside rows begin that same process. Heating the large blocks of cold eggs was very detrimental to the hot eggs packed tightly on nearby trolleys. Also, the large block made it difficult to cool the interior eggs once the egg mass reached the later stages of development. So, while this process improved the working conditions in the hatchery, it did so at the price of hatch percentage.



Chick Master CO₂ Probe typically mounted through the roof of the setter with the electric unit (left) positioned outside the cabinet

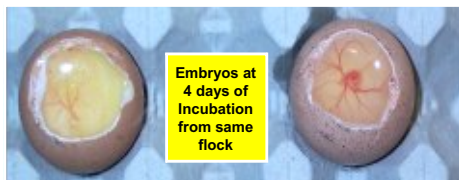
The single stage process has none of the advantages described and all of the disadvantages noted above. But it has one huge advantage that neither of the other processes can match — if you can control the environment inside the setter, all of eggs inside that setter are seeking the same thing at that moment — whatever that thing they are seeking may be. If you are in the first stages of setting, all of the eggs want heat, humidity, and carbon dioxide to be present. In the middle stages, all of

The Case For Single Stage Incubation continued

the eggs want the humidity to be at a certain level, a comfortable temperature and enough fresh air to keep the CO₂ level below the danger point. At later stages they want heat and humidity removed and want constant access to huge amounts of fresh air. No matter where they are in the setter, they want the same thing. Now, if only the setter can deliver what they want.

POSITIVE EFFECTS OF HIGHER CO₂ IN EARLY INCUBATION

Embryos show greater development when exposed to higher levels of CO₂ during the closed phase of the Avida incubation process



Conventional Multi Stage Setter

Avida Single Stage Setter with CO₂ injection

The setter itself must be sealed to virtually airtight conditions. There is incontrovertible evidence that the presence of elevated CO₂ in the sealed box provides benefits to the embryo in the early stages of growth. We are not research biologists so we are not the most qualified to speak on this issue, but all evidence we see is quite clear that the presence of a controlled amount of CO₂ leads to significantly stronger vascular system, a superior skeletal system and better muscle development and feather growth. It is also clear that the constant heat and humidity setting provided by removing all external air gives the embryo a consistent, comfortable environment to begin its life cycle in.

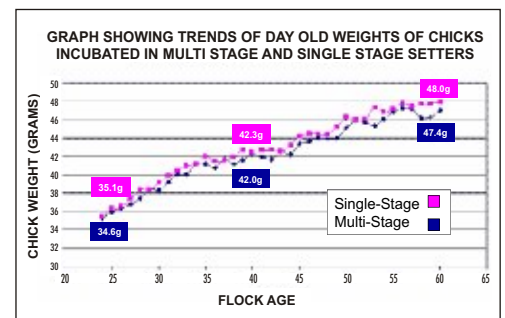
We also know that albumen acts as an antibacterial agent protecting the yolk from any bacterial growth. Albumen has a very low concentration of free nitrogen which is required by bacteria for protein synthesis. We know that the higher CO₂ level, the lower the O₂ level and this may help keep the high pH of the albumen which in turn helps to kill bacteria. By minimizing the weight loss in the first (closed) cycle of the process, the single stage approach virtually eliminates the pH change in the albumen. The embryo remains better protected against germ intrusion.

The less vapor loss during this period the better the hatch and grow out performance of these birds will be.

The desired setting pattern for single stage is to first stabilize the egg mass in the setter and a temperature mimicking the egg room conditions. Then, approximately 8 - 10 hours prior to the technical "start" of the incubation cycle, program the setter to bring the egg mass up to a temperature just below that where rapid cell division begins. We generally suggest around 73 degrees F (22.8 degrees C). Finally, bring the setter up to incubating temperature (from 99.5 degrees F to 100.5 degrees F — 37.5 degrees C to 38.1 degrees C — depending primarily on altitude) and program the remaining 504+ hours of incubation.

Minimal air flow typically with a fully closed damper usually is done for at least 4 days and up to 10 days. There are some things to watch for in this period. The greater the fertility of the flock, the faster the CO₂ levels will rise. We believe that the most critical period is the first 4 to 5 days where tests have shown the elevated CO₂ dramatically improves the embryo. We recommend injected CO₂ at the time of setting to bring the levels of CO₂ up to .9%. Since it is generally accepted that CO₂ levels in excess of 1% in the air will cause detrimental hatch results, it is advisable to have a CO₂ control if you intend to

leave the box sealed for the entire 10 days or if you intend to inject CO₂ in the early days. It is clear that the carbon dioxide created by the developing embryo increases dramatically in the 9th and 10th day of the process, then continues to increase each subsequent day in amounts roughly equivalent to the total CO₂ exhausted in the first 6 days. Allowing the CO₂ level to rise above 1% is not advisable. In fact, there is little evidence that the elevated CO₂ levels in days 6 and later provide any significant further improvement in hatch quality or quantity. However, closed dampers do make for more even temperatures throughout the setter.



Comparison of chick weights, by age, based on two years data. The trend shows consistently heavier chicks from the Chick Master Avida single stage setter.

We have found that most of the current commercial breeds can be sealed into a virtually airtight environment for up to

SETTER PROGRAMME																				
Stage Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Temp Set Point	69.8	73.0	100.1	100.0	100.0	99.9	99.8	99.7	99.6	99.4	99.2	99.0	98.8	98.6	98.4	98.2	98.0	97.8	97.7	97.6
Temp High Alarm	80.0	83.0	101.1	100.7	100.7	100.6	100.5	100.4	100.3	100.1	99.9	99.7	99.5	99.3	99.1	98.9	98.7	98.5	98.4	98.3
Temp Low Alarm	66.0	69.0	69.0	99.3	99.3	99.2	99.1	99.0	98.9	98.7	98.5	98.3	98.1	97.9	97.7	97.5	97.0	97.1	97.0	96.9
Humid Set Point	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	70.0	60.0	50.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Humid High Alarm	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.0	80.0	80.0	80.0	70.0	70.0	70.0	60.0	60.0	60.0	60.0
Humid Low Alarm	20.0	20.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Man. Damper Set Point	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Min. Damper Set Point	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Damper Mode	DM	DM	DM	DM	DM	DM	DM	DM	DM	AHC	AHC	AHC	AHC	AHC	AHC	AHC	AHC	AHC	AHC	AHC
Cooling Mode	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT
Aux Fan On At Damper	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off
Aux Fan Auto/Man/Off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off
CO ₂ Set Point	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO ₂ High Alarm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO ₂ Low Alarm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Turning Tilt Time (mins)	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	5.0
Level Time (mins)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	240.0
Time in Hours	9.0	3.0	12.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0

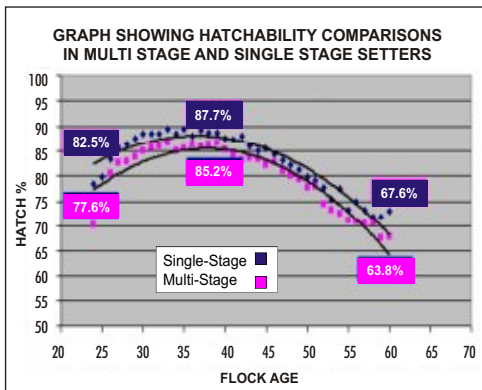
DAMPER MODES	DM	Damper Manual
	ATC	Auto Temp Control
	AHC	Auto Humidity Control
	ACC	Auto CO ₂ Control

NOTES
 STAGE 1 AND 2 ARE FOR EGGS STORED AT 21C = 69.8F
 STAGE 1 IS A HOLDING STAGE AND CAN BE CHANGED IN DURATION
 STAGE 2 IS DESIGNED TO ALLOW EGGS TO WARM UP FROM STORAGE TEMPERATURE EVENLY
 STAGE 3 WILL BRING THE EGGS UP TO INCUBATION TEMPERATURE AND COMMENCES INCUBATION

Typical Chick Master twenty stage, single stage, step program for broiler incubation

The Case For Single Stage Incubation continued

10 days without exceeding the detrimental level of CO₂ in the box. However, this is not universally true nor is it universally advisable to do. Eggs from highly fertile flocks that are set when freshly collected (high fertility) can be a problem due to the propensity of single stage to keep the embryo alive. For this reason, those companies intending to use the full 10 day sealed process as well as those intending to manage the level of CO₂ at an elevated rate during the remaining setter time are advised to use CO₂ control on their single stage setter.



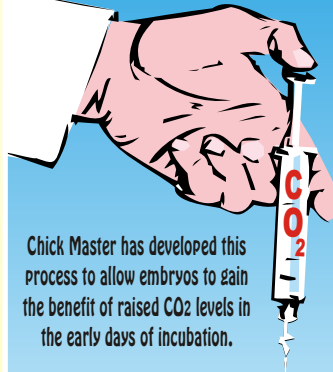
Hatchability results from 18 months of data (72 million chicks). The trend shows consistently better hatchability from the Avida single stage setter regardless of flock age.

A second issue that needs to be considered carefully is the bio-security of the practices followed in the hatchery and in the process of getting the eggs to the hatchery. While the embryos tend to be stronger in the single stage process, you need to remember that you lose most of the benefit if you open the setter prematurely. If you set floor eggs, cracked eggs, dirty eggs, etc. (eggs that will explode or cause contamination) you will find that practice translating into a reduced hatch. You must be prepared to improve the processes around the setter and leading to the setter if you expect to achieve maximum benefit!!!

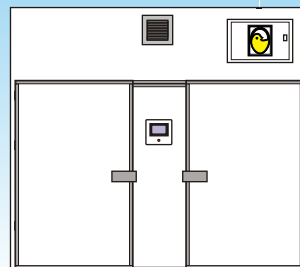
The Case For Single Stage Incubation
 Second instalment will be released
 in 4 - 6 weeks

Ask about...

CO₂ Injection Systems for Avida setters



Chick Master has developed this process to allow embryos to gain the benefit of raised CO₂ levels in the early days of incubation.



...our September Special Tray Offer

VOSTERMANS FAN UPGRADE KITS

NO MORE WOODEN FAN BOARDS!

High efficiency fans and bio-secure plastic fan boards for Classic and Buckeye series setters



...Formaldehyde Monitoring

...Data Loggers



Central Hatchery Alarm System

The Chick Master Central Alarm System has been designed so that hatchery personnel can quickly identify and respond to machine alarm conditions.

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

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