

Incubating_2004.txt

Successful incubation depends on maintaining favorable conditions for hatching fertile eggs. Four factors of major importance are temperature, humidity, ventilation, and turning. Commercial incubators are automated to control all of these factors. With small incubators, some of these factors must be controlled manually.

Small incubators that have various degrees of mechanization are now available. Some county Extension offices have incubators that may be borrowed. It is also possible to build an incubator using plans.

Temperature must be closely regulated, and the thermometer should be at the same level as the eggs. Commercial incubation is accomplished at approximately 99.5 degrees F. Temperature can be controlled within plus or minus 0.1 degrees F. Small incubators cannot be controlled that closely. If control is within plus or minus 2 degrees F, hatching is usually successful. If the incubator does not have a fan to circulate air (still air incubator), the suggested temperature is several degrees higher, about 102 degrees F. Follow the manufacturer's instructions.

Sources for incubators.

Bowles Poultry Supplies
312 O'Connor Road
Lucasville, OH 45648
Phone: 614-372-3973
Cutler's Supply, Inc.
3805 Washington Road
Carsonville, MI 48419
Phone: 810-657-9450

GQF Manufacturing Co.
P.O. Box 1552
Savannah, GA 31498-2701
Phone: 912-236-0651
Humidaire Incubator Company

P.O. Box 9
New Madison, OH 45346
Phone: 800-410-6925

Nasco Farm Catalog

Make your own. Many 4H publications have them at no or low cost.

Humidity and Ventilation

The amount of moisture that is in the air is the relative humidity. It is usually measured by a wet bulb thermometer. Function depends on the cooling caused by evaporating water. A thermometer is covered by a cloth sleeve that extends into a container of water. At a given temperature, high humidity causes little water evaporation and little cooling of the thermometer; therefore, the wet bulb thermometer reading is similar to that of the dry bulb thermometer. If the humidity is low, much evaporation occurs, resulting in a lowering of wet bulb temperature; therefore, the wet bulb temperature is much lower than the dry bulb temperature.

Humidity must be regulated. Commercial incubation maintains a wet bulb temperature of about 85 degrees F for the first 18 days for chicken eggs and 91 degrees F for the last 3 days. Humidity should be set so that an egg loses 13 percent of its initial weight by the last 2 days before hatching. Achieving this weight loss by an ostrich egg requires a wet bulb temperature of 70 degrees F. Too much or too little humidity in the incubator will cause hatching problems and the death of embryos.

If an incubator has too little moisture, the amount can be increased by increasing the area of water available for evaporation. A bigger pan can be used, or sponges can be placed in the water. The air flow through the incubator might also be decreased. Some air exchange

between the inside and outside of the incubator should happen continuously to replace oxygen used by the developing embryos. When that need is met, air exchange can be managed according to heat and humidity requirements. More air flow tends to lower incubator temperature and humidity.

Turning Eggs

In commercial incubation, eggs are placed in flats, and the flats are automatically tilted back and forth every hour. The purpose of turning is to prevent the developing embryo from sticking to the shell. For eggs in small incubators that do not have an automatic turner, it is recommended that they be turned at least three times a day.

To assist this procedure, place a mark on each egg with a pencil. Alternate the position of the mark when eggs are turned. If eggs are incubated in an upright position, the round end always should be up and the more pointed end down. Beginning at day 18, chicken eggs should no longer be turned.

The need to turn eggs is being re-examined. There is some evidence to suggest that eggs need to be turned for only the first half of incubation; however, at this time the safest recommendation is to turn chicken eggs for the first 18 days of incubation.

Incubator Operation

Incubators have been designed to operate in rooms that are comfortable for people. If a room is too hot or cold, an incubator may not be able to hold the proper temperature. If the incubator is in a room where temperatures are decreased to 55 degrees F over the weekend, hatchability will be affected. Start the incubator a day or two before incubating the eggs. Be certain that it is operating properly before incubating the eggs.

If several people will be involved with the incubation project, it is best to keep a written record.

When the hatch is completed, disconnect the incubator. The chicks, shells, and unhatched eggs should be removed and the interior wiped clean with a soapy sponge. It should be permitted to air dry for several days before using it again or putting it in storage.

Hatching Problems

A good hatch from a small incubator is indicated when 70 percent or more of the eggs hatch, and the chicks are active and fluffy. It is not unusual for inexperienced incubator operators to encounter problems. (Turkey eggs have a very low rate for hatching due to low sperm counts - I tended to get one chick per 10 eggs and that is why my mentor who specialized in rare heirloom livestock got as well)

One way to follow the progress of incubation is to candle the eggs. An egg candler can be purchased, or a flashlight can be used. Hold a small flashlight against an egg in a dark room to candle an egg. Part of the inside then becomes visible. By 5 days of incubation, blood vessels should be visible if the egg has a white shell. If the egg has a brown shell, several more days of incubation may be required before blood vessels are visible. If development does not occur, the eggs may not be fertile, or there may be serious incubation problems. By day 8 or 9, the chick may be startled by the light, and its movement can be seen. Candling at later stages of incubation should show that the embryo is growing and filling up the space inside the egg.

If there are problems with incubation, the chicks that hatch may provide clues about the problem. A list of possible problems and suggested solutions is given below. Chicks that have not hatched on time may be helped. If the shell is pipped (chick has punched a hole

from the inside) and there is movement, the egg may be examined. The shell can be removed in small pieces. If bleeding occurs, the chick is not ready. If no bleeding occurs, the chick can be helped from its shell.

Additional information may be collected by breaking the eggs that did not hatch. If they are broken onto a flat surface, the contents will indicate an infertile egg or show how far development proceeded before death.

Solving incubation problems.

No blood vessels
at candling Eggs not fertile Check flock management
Embryo died very early Check egg holding conditions
Check incubation operation

Many dead embryos Temperature too high or low Check incubator
and accuracy of thermometer
Improper turning Turn 3 times per day
Poor oxygen supply Increase ventilation
Poor nutrition Check breeder flock diet

Piped eggs not
hatching Low humidity Have correct wet bulb temperature

Hatch too early High temperature Check temperature

Hatch too late Low temperature Check temperature

Shells stick to chicks High humidity early
or low humidity late Check humidity

Cripples Temperature problems Check incubator

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Humidity problems Check incubator
Improper turning Correct turning
Smooth hatching trays Provide better traction

Large, soft-bodied
weak chicks Low temperature Check temperature
Poor ventilation Improve air flow

Mushy chicks,
dead on tray Navel infection Improve sanitation

Rough navels High temperature or wide temperature fluctuations
Check temperature
Low moisture Check wet bulb temperature

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