



Hatching small numbers of eggs

J.C. Hermes

Incubation is the process by which the embryo within the egg develops into a fully formed chick capable of breaking free from the shell. Incubating eggs requires several important environmental considerations if any chicks are to hatch. Of primary concern are temperature and relative humidity. Attention to secondary considerations can result in increased numbers of eggs hatching.

Natural vs. artificial incubation

The first decision to be made is whether to incubate eggs naturally or artificially. **Natural incubation** uses a broody hen to incubate eggs by sitting on them in a nest. Broody hens, when available, work best for small clutches of eggs.

Broodiness, the behavior of a setting hen, has been bred out of some chickens. Others don't care for chicks effectively. Some breeds commonly used to hatch eggs include New Hampshires, Plymouth Rocks, Rhode Island Reds, and Cochins. Many bantam varieties also make good mothers.

Another consideration is the hen's size. Larger breeds can easily incubate up to a dozen large chicken eggs, 10 duck eggs, or 5 goose eggs. Bantams may be able to incubate only six large chicken eggs and would not be useful to incubate duck or goose eggs.

Artificial incubation uses an incubator to do the job of the broody hen. The incubator closely controls temperature and

relative humidity within the proper limits to hatch chicks. Artificial incubation is an excellent alternative to the broody hen.

Temperature

Correct incubation temperature depends on the type of incubator. In forced draft incubators, those in which a fan is present, temperature should be maintained between 99.5°F and 100°F for most bird eggs. In still air incubators, where no fan is present, a temperature of between 101°F and 103°F measured at the top of the egg is necessary.

Temperatures that vary more than 1 or 2 degrees from these levels can result in poor hatching. Shifts of 4 or 5 degrees can be lethal to the developing chicks.

Relative humidity

Most eggs require a fairly high relative humidity to hatch successfully. Humidity in the incubator regulates the amount of moisture lost from the egg during incubation. In most small



incubators, humidity is attained by filling a pan or some other reservoir in the incubator with water.

For most eggs, a relative humidity of between 55 and 60 percent is adequate during the early period of incubation. During the 3 to 4 days just prior to hatching, humidity should be increased to about 70 percent.

Waterfowl eggs require higher humidity. Sprinkling or misting eggs daily may be necessary for proper hatching of waterfowl eggs.

James C. Hermes, Extension poultry specialist, Oregon State University. This replaces an Oregon State University Extension publication by the same title.



Measure humidity in small incubators by determining the wet-bulb temperature. Most manufactured incubators are equipped with two thermometers. One has a wick attached (wet bulb), while the other does not (dry bulb). Place the wick in a constant supply of water so the area around the bulb of the thermometer is moist. (The

thermometer bulb should not be in the water.)

Due to evaporative cooling, the wet-bulb thermometer will read somewhat lower than the dry-bulb. At 99.5°F dry-bulb, a wet-bulb reading of between 85°F and 87°F indicates a proper humidity level of around 56 to 60 percent. Wet-bulb temperature should be raised to about

90°F to 92°F during the last 3 to 4 days of incubation to help the chicks hatch.

Adjust the humidity in small incubators by either changing the surface area of the water or changing the ventilation rate. A wider water container exposes more surface area to evaporation, increasing the humidity. Reducing air flow introduces less

Important tips for a successful hatch

1. Obtain eggs from a reputable breeder farm. Most eggs sold at the local market are infertile and will not develop into chicks. In many instances, home-produced hatching eggs don't hatch well for a variety of reasons.
2. Begin incubation before eggs are 2 weeks old. Keep eggs as close to 55°F as possible prior to setting. Refrigerator temperatures are too cold. At 80°F, eggs develop abnormally and don't hatch.
3. **Do not** wash hatching eggs. Choose only nest clean eggs for hatching. Minimal soiling can be removed by dry cleaning with fine sandpaper. Washing can introduce microbes through pores in the shell, which may cause rots and infected eggs.
4. Do not set cracked, dirty, or misshaped eggs. They do not hatch well and can break in the incubator, causing potential problems and a mess.
5. Before beginning incubation, thoroughly clean the incubator. Start the incubator a day early and test its operation prior to setting any eggs.
6. Candle eggs after about 1 week of incubation. Remove infertile and cracked eggs as well as dead embryos.
7. Allow the chicks to dry off before removing them from the incubator and placing them under a brooder.

Hatching small numbers of eggs

dry air, so moist air is kept inside the incubator. Take care to not open the incubator too frequently because this reduces humidity and results in poor hatching.

Position and turning

Eggs can be set either vertically, with the blunt end up, or horizontally, on their sides. Follow the directions from the manufacturer for the proper procedure for your incubator.

For proper hatching, eggs must be turned during most of the incubation period, stopping 3 or 4 days prior to hatching. Some incubators have automatic turning features; when using these machines, follow the manufacturer's directions for best results.

When turning by hand, mark eggs on opposite sides with different markings. An X and O will suffice. Turn the eggs at least three times per day. Turning an odd number of times each day ensures that the egg is not in the same position 2 nights in a row, which usually is the longest time between turns.

Turn eggs a different direction at each turn—a back-and-forth movement. Rolling eggs the same direction day after day can injure the delicate circulatory system of the developing embryo.

Ventilation

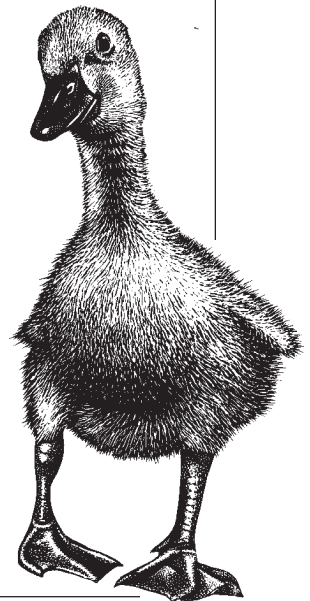
All incubators are built with air vents. They are placed strategically to draw fresh air into the incubator and expel stale air and excess carbon dioxide. If

the incubator is full of eggs, the need for fresh air will increase as the embryos develop. It may be necessary to open the vents slightly, if possible, late in the incubation period. Take care not

to lose humidity if you open the vents. In many small incubators, the vents are not adjustable and are designed to be adequate for the entire hatch.

Common incubation periods

17 days	Japanese quail
21 days	Chicken
24 days	Ringneck pheasant Chukar partridge Valley and Bobwhite quail
28 days	Turkey Guinea fowl Peafowl Most ducks
30 days	Most geese
35 days	Muscovy duck Canadian geese





Pacific Northwest Extension publications contain material written and produced for public distribution. You may reprint written material, provided you do not use it to endorse a commercial product. Please reference by title and credit Pacific Northwest Extension publications.

Pacific Northwest Extension publications are jointly produced by the three Pacific Northwest states—Oregon, Washington, and Idaho. Similar crops, climate, and topography create a natural geographic unit that crosses state lines. Since 1949 the PNW program has published more than 450 titles. Joint writing, editing, and production have prevented duplication of effort, broadened the availability of faculty specialists, and substantially reduced the costs for participating states.

Published and distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914, by the Oregon State University Extension Service, Lyla Houghlum, interim director; Washington State University Cooperative Extension, James J. Zuiches, director; the University of Idaho Cooperative Extension System, LeRoy D. Luft, director; and the U.S. Department of Agriculture cooperating.

The three participating Extension Services offer educational programs, activities, and materials—*without regard to race, color, religion, sex, sexual orientation, national origin, age, marital status, disability, and disabled veteran or Vietnam-era veteran status*—as required by Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, and Section 504 of the Rehabilitation Act of 1973. The Oregon State University Extension Service, Washington State University Cooperative Extension, and the University of Idaho Cooperative Extension System are Equal Opportunity Employers. Published January 1995; Reprinted October 1995. 50c/50c/50c
