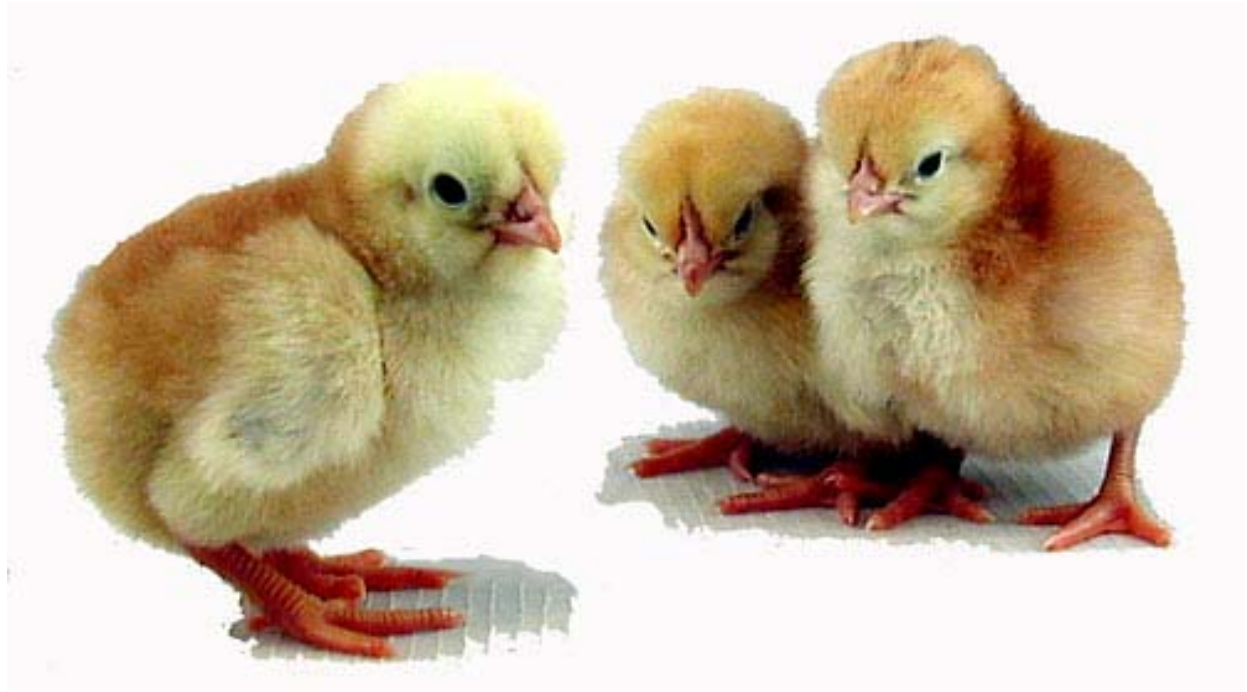
NEW BIOSPHERE AGRICULTURE

Free Range Chickens



"Peace And Spirit Creating Alternative Solutions"

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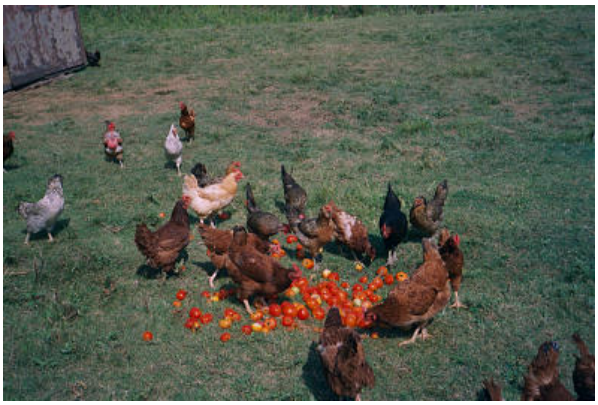
Free range CHICKENS:

http://en.wikipedia.org/wiki/Free_range

Free range is a term which outside of the United States denotes a method of farming husbandry where the animals are allowed to roam freely instead of being contained in any manner. In the United States, USDA regulations apply only to poultry and indicate that the animal has been allowed access to the outside. The USDA regulations do not specify the quality or size of the outside range nor the duration of time an animal must have access to the outside.

The term is used in two senses that do not overlap completely: as a farmer-centric description of husbandry methods, and as a consumer-centric description of them. Farmers practice free range to achieve free-range or humane certification, to reduce feed costs, to produce a higher-quality product, and as a method of raising multiple crops on the same land.



Free range may apply to meat, eggs or dairy farming.

In ranching, free-range livestock are permitted to roam without being fenced in, as opposed to fenced-in pastures. In many of the agriculture-based economies, free-range livestock are quite common.

History

If one allows "free range" to include "herding", free range was a typical husbandry method at least until the development of barbed wire and chicken wire. The generally poor understanding of nutrition and diseases before the twentieth century made it difficult to raise many livestock species without giving them access to a varied diet, and the labour of keeping livestock in confinement and carrying all their feed to them was prohibitive except for high-profit animals such as dairy cattle.

In the case of poultry, free range was the dominant system until the discovery of vitamins A and D in the 1920s, which allowed confinement to be practiced successfully on a commercial scale. Before that, green feed and sunshine (for the vitamin D) were necessary to provide the necessary vitamin content. Some large commercial breeding flocks were reared on pasture into the 1950s. Nutritional science resulted in the increased use of confinement for other livestock species in much the same way.

United States

Free range jurisdictions

Traditional American usage equates "free-range" with "unfenced," and with the implication that there was no herdsman keeping them together or managing them in any way. Legally, a free-range jurisdiction allowed livestock (perhaps only of a few named species) to run free, and the owner was not liable for any damage they caused. In such jurisdictions, people who wished to avoid damage by livestock had to fence them out; in others, the owners had to fence them in.

Free range poultry

In recent years, with the days of free-range cattle mostly in the past, neither the presence of a "legal fence" surrounding the farm nor the pros and cons of old-time free-range ranching are the main points of interest. Instead, the term "free range" is mainly used as a marketing term rather than a husbandry term, meaning something on the order of, "low stocking density," "pasture-raised," "grass-fed," "old-fashioned," "humanely raised," etc. In poultry-keeping, "free range" is widely confused with yarding, which means keeping poultry in fenced yards. Yarding, as well as floorless portable chicken pens ("chicken tractors") may have some of the benefits of free-range livestock but, in reality, the methods have little in common with the free-range method.

A behavioural definition of free range is perhaps the most useful: "chickens kept with a fence that restricts their movements very little." This has practical implications. For example, according to Jull, "The most effective measure of preventing cannibalism seems to be to give the birds good grass range." De-beaking was invented to prevent cannibalism for birds not on free range, and the need for de-beaking can be seen as a litmus test for whether the chickens' environment is sufficiently "free-range-like."

De-beaking does not address the fact that cannibalistic tendencies stem from stress hormone elevation, which results directly from overcrowding conditions, and that these stress hormones inhibit the conditions necessary for the development of omega-3 fatty acids and drastically diminish the nutritive value of both the meat and eggs. As a result of that, the addition of omegas to chicken feed has been an attempt to address the inability of chickens to have enough access to insects and seeds during daily forage. Chicken's peck at each other out of aggression to disperse their population out to more naturally sustainable levels within a given environment. A rule of thumb is that if debeaking is required to address chickens' excessive pecking and cannibalism behaviour, the chickens are under stress and the meat and egg products, as a result, are of lesser quality.

Free range meat chickens seek shade on a U.S. farm

The U.S. Department of Agriculture Food Safety and Inspection Service (FSIS) requires that chickens raised for their meat have access to the outside in order to receive the free-range certification. There is no requirement for access to pasture, and there may be access to only dirt or gravel. Free-range chicken eggs, however, have no legal definition in the United States. Likewise, free-range egg producers have no common standard on what the term means.

The USDA has no specific definition for "free-range" beef, pork, and other non-poultry products. All USDA definitions of "free-range" refer specifically to poultry. No other criteria-such as the size of the range or the amount of space given to each animal-are required before beef, lamb, and pork can be called "free-range". Claims and labelling using "free range" are therefore unregulated. The USDA relies "upon producer testimonials to support the accuracy of these claims."

In a December 30, 2002 Federal Register notice and request for comments (67 Fed. Reg. 79552), USDA's Agricultural Marketing Service proposed "minimum requirements for livestock and meat industry production/marketing claims". Many industry claim categories are included in the notice, including breed claims, antibiotic claims, and grain fed claims. "Free Range, Free Roaming, or Pasture Raised" would be defined as "livestock that have had continuous and unconfined access to pasture throughout their life cycle" with an exception for swine ("continuous access to pasture for at least 80% of their production cycle"). This proposed rule making is still in play. In a May 12, 2006 Federal Register notice (71 Fed. Reg. 27662), the agency presented a summary and its responses to comments received in the 2002 notice, but only for the category "grass (forage) fed" which the agency stated was to be a category separate from "free range." Comments received for other categories, including "free range," are to be published in future Federal Register editions.

The broadness of "free range" in the U.S. has caused some people to look for alternative terms. "Pastured poultry" is a term promoted by farmer / author Joel Salatin for broiler chickens raised on grass pasture for all of their lives except for the initial brooding period. The Pastured Poultry concept is promoted by the American Pastured Poultry Producers' Association (APPPA), an organization of farmers raising their poultry using Salatin's principles.

Alternative terminology can also be used to make high-density confinement sound more palatable. For example: *cage-free, free-running, free-roaming, naturally nested,* etc. are used as an alternative to the technical term, *high-density floor confinement.* Whether high-density floor confinement is more humane than high-density cage confinement is arguable, but in any event, high-density confinement (of whatever type) is the antithesis of free range.

European Union

A free range chicken flock

The European Union regulates marketing standards for egg farming which specifies the following (cumulative) minimum conditions for the free-range method:

- hens have continuous daytime access to open-air runs, except in the case of temporary restrictions imposed by veterinary authorities,
- the open-air runs to which hens have access is mainly covered with vegetation and not used for other purposes except for orchards, woodland and livestock grazing if the latter is authorised by the competent authorities,
- the open-air runs must at least satisfy the conditions specified in Article 4(1)(3)(b)(ii) of Directive 1999/74/EC whereby the **maximum stocking density is not greater than 2,500 hens per hectare of ground available to the hens or one hen per 4m^2** at all times and the runs are not extending beyond a radius of 150 m from the nearest pophole of the building; an extension of up to 350 m from the nearest pophole of the building is permissible provided that a sufficient number of shelters and drinking troughs within the meaning of that provision are evenly distributed throughout the whole open-air run with at least four shelters per hectare.

Otherwise, egg farming in EU is classified into 4 categories: Organic (ecological), Free Range, Barn, and Cages.) The mandatory labelling on the egg shells attributes a number (which is the first digit on the label) to each of these categories: 0 for Organic, 1 for Free Range, 2 for Barn and 3 for Cages.

There are EU regulations about what free-range means for laying hens and broilers (meat chickens) as indicated above. However, there are no EU regulations for free-range pork, so pigs could be indoors for some of their lives. In order to be classified as free-range, animals must have access to the outdoors for at least part of their lives.

United Kingdom

Free-range pregnant sows are kept in groups and are often provided with straw for bedding, rooting and chewing. Around 40% of UK sows are kept free-range outdoors and farrow in huts on their range.

Egg laying hens Cage-free egg production includes barn, free-range and organic systems. In the UK, free-range systems are the most popular of the non-cage alternatives, accounting for around 28% of all eggs, compared to 4% in barns and 6% organic. In free-range systems, hens are housed to a similar standard as the barn or aviary.

Turkeys Free-range turkeys have continuous access to an outdoor range during the daytime. The range should be largely covered in vegetation and allow more space. Access to fresh air and daylight means better eye and respiratory health. The turkeys are able to exercise and exhibit natural behaviour resulting in stronger, healthier legs. Free-range systems often use slower-growing breeds of turkey.

Free Range Rearing of Chickens Free Range Rearing of birds is now being pioneered in the UK by various poultry rearing farms allowing the birds outside from just a few weeks of age and not just after the birds have been reared in barns and allowed out at 16 weeks. Allowing the birds outside space from just 4 weeks old.

Free-Range Chickens

http://www.hffinc.com/FreeRangeChickens.htm

These are pictures from one of our customers in Bermuda who is successfully raising free-range laying chickens. He has a very neat simple set up with easy to move pens.

Carts that he uses to move the chicken pens.

A similar type of chick facility is available on-line at FarmTek.com Search their catalogue for "Chick-Inn Hutch"

CHICKEN HATCHERY

http://www.wagnerspoultry.com.au/hatchery.htm

Here at Wagner's Poultry we dispatch day old chickens and ducklings fortnightly throughout the year. Sexed day olds are available for sale every 2nd Wednesday morning from 8am to 12 midday. Brown, black and white chicks will be there for you to choose, along with feed and water dispensers and feed. Information sheets are also issued regarding their care.

The most important fact in caring for day old chicks and ducks is HEAT! In fact, they should be kept inside under a heat lamp or brooder for about 5 -6 weeks. By this time they are just about fully feathered. It is then safe to rear them outside in a contained area, with a dry sheltered area in which to sleep. Their main predators at this stage are cats, dogs, crows, and of course, foxes! Care should therefore be taken to make sure their pen is well secured at night.

Our birds are a commercial egg laying strain. They are bred for **maximum egg production** rather than meat. Once they reach maturity at about 22 weeks, they will start laying.

Prices

Day old chicks are AU$3.50 (females). This price includes full vaccinations. For orders over 100 the price is set at AU$3.30 each, picked up at the farm on the Hatch Wednesday.

Freight by trucking companies to certain parts of Northern and Eastern Victoria can be arranged at a further AU$25 per 100 (or part thereof). Enquiries are currently being made regarding transporting to other parts of country Victoria. Cockerels (day old roosters) can be ordered and purchased on Hatch Day at AU$0.70 cents each. These can be sent by freight vehicles as well.

Ducklings are AU$4 each for the egg layer Khaki Cambell / Pekin cross, and now available are the slightly larger Pekins, the white ducks. These 'cuties' make wonderful pets and lay eggs at around 20 weeks of age.

Alternatively, you can purchase fertile eggs and even have a go at hatching your own in an incubator that we have for hire. This has proven to be a great experience for the kids, and many schools throughout Victoria have hired the incubator for hatching either their own eggs or fertile eggs purchased on the farm.

FAQs: Chickens & Hens

http://egglayingchickens.com/FAQ-how-long-chicken-egg-hatch.html

How long does it take for a chicken egg to hatch?

Baby peeps will hatch from their eggs about 21 days after they begin the incubation period. In an incubator, this number can be easily monitored. However, when a laying hen who hatches her own eggs, she will first lay a clutch over a period of a couple weeks and then begin sitting on them all at the same time. Thus the amount of time it takes for the chicken egg to hatch is longer when accounting for the days after it is laid before the hen begins the sitting, or 21-day natural incubation, process.

How often do chickens lay eggs?

Frequency of egg laying varies by breed. Some chickens are **prolific layers, such as Leghorns and Rhode Island Red & Rhode Island White breeds, which lay 5-7 eggs a week at their peak**. Conversely, some chickens have light egg production, including the rare Buckeye chicken that lays 2 eggs a week. Plymouth Rock hens are in the middle with about three eggs per week. How often chickens lay eggs depends on their breed and strain. Learn as much as you can about the egg-producing chicken breeds before selecting your hens.

How can you tell if a hen is old?

Figuring out the age of your hen is the best way to tell if a hen is old and won't lay eggs as productively, or at all. The average life span of a hen is five years. Their best egg production is during the first two years; after that they lay fewer eggs per week until they taper off production entirely. If you are looking at hens to purchase, the best way to get your money's worth is to buy young pullets who are not yet laying, rather than hens who have already been in production for some time. Keep track of your hens' **ages with leg bands**, which you can colour code for the year the hen hatched or simply inscribe with the date.

How long do hens lay eggs?

Hens lay well for the first two years of their lives, and then production begins to drop off. Hens that are five years or older may still lay an egg several times a month, but their limited production usually means they are culled from the flock (unless owners wish to keep them as pets). Most commercial egg productions cull hens after the first or second year of egg production for maximum efficiency.

Why are my hens not laying?

If your hens are not laying, there are several factors that need to be considered. Are the hens old, as in 5 years or older? **Egg production slows dramatically after the first three years**. They may not be laying in the winter if there is not enough light to stimulate egg production. This can be fixed by turning on a light bulb in their coop in the early morning and late evening (using a timer is best). If there has recently been a disruption, such as a new coop built or new hens added to the flock, or the chickens have been moved, they may stop laying eggs for a few weeks and then begin laying again.

Do hens need a rooster to lay eggs?

No, hens do not need a rooster to lay eggs; they will produce eggs regardless of the presence or absence of a male chicken. However, they will only have fertile eggs or be able to hatch eggs into chicks if there is a rooster to fertilize them.

Does coop colour influence egg production of chickens?

No, coop colour does not in any way influence hens' egg production. Their laying frequency and egg colour will not alter based on coop colour.

How long does it take a chicken to lay an egg?

From the time she enters the coop or sits on her nest until she actually lays the egg is generally about 30 minutes. However, much of that time is spent preparing for delivery of the egg. Once she stands up to actually lay the egg, it only takes a minute or so for the egg to come out.

How are chicken eggs fertilized?

Chicken eggs are fertilized internally before they are laid, from sperm deposited in the female when the rooster and hen mate. Since it takes about 7-10 days for the sperm to travel to the ovary where they fertilize the ovum as it is released, a chicken won't have fertile eggs for at least a week after she is first mated. She will continue to lay fertile eggs for about six to ten days after she has last been mated.

About Laying Hens

5 Laying Chickens to Have: A few **laying chickens** in the backyard are great for insect control, grass fertilizer and cheap entertainment -- not to mention fresh, nutritious eggs. Once you have a secure pen (check out our chicken coop plans page for ideas) and a bag of grain, you're ready to get started with a flock.

Rhode Island Reds: These classic hens are a dual-purpose breed; they are both proficient egg layers and the males are large enough to eat (meat birds). This is especially good if you decide to incubate and hatch your eggs; the males can be raised for meat and the females kept for egg laying purposes. This breed tends to produce hens with easygoing personalities; docile and friendly, they make good pets for children. They lay brown eggs, almost one per day. If they are allowed to free range, their eggs will often be jumbo in size.

Barred Rock is the name of a particular colour pattern in the Plymouth Rock breed. These black and white birds are another dual-purpose breed, very hardy and a steady egg layer. They are a little less friendly than the Rhode Island Reds, but make up for it with their docility and ability to go broody;

that is, to incubate and hatch eggs. They are also consistent, reliable egg layers and protective of young chicks. Their roosters get tall and handsome and make great flock guardians.

Americaunas have been dubbed "Easter Egg Chickens" because of their lovely eggs, which have shells coloured various shades of blue and green. These birds are prized in backyard flocks for adding variety to the egg basket as well as to the flock. Their personality varies; some are a bit standoffish while others respond well to attention from humans. They have facial features, such as beard and muff, which give them more character and make them fun to look at.

Leghorn hens, a breed originating from Italy, are possibly the best chicken to have for overall egg production and efficiency. As a lighter hen, they require less feed and lay more eggs annually than practically all other breeds. They are basically egg-producing machines. Their eggs are white, not brown, but with a good flock of brown egg layers the white will add a different colour that sets off the brown and makes for a nice varied basket of eggs. Most newer laying chicken breeds, such as sex link hens, have some Leghorn in them.

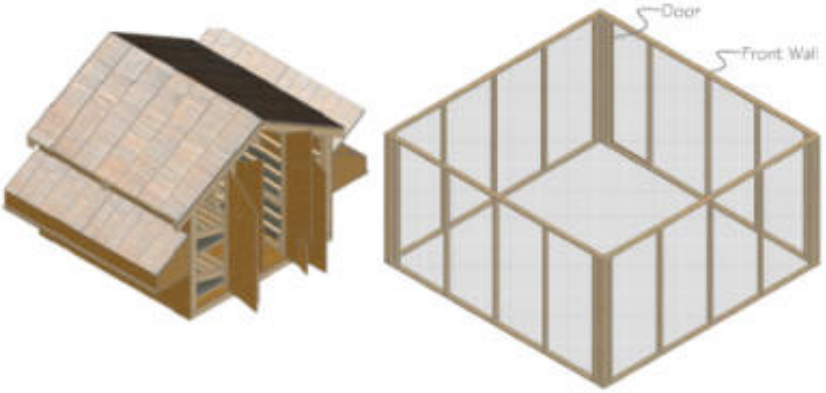
Orpington chickens hail from England, and are another dual-purpose bird as they get large enough for meat purposes but also produce friendly hens that lay brown eggs in abundance. The ruddy coloured variety pictured here is known as Buff Orpingtons; other recognized colours for this breed include black, white, and blue. The birds have a wide, low stature and a broad chest. They are great to add to your flock of laying chickens and produce lovely brown eggs.

With a variety of different laying chickens in your flock, backyard hens can be a fun adventure, and quite satisfying and profitable as well.

Chicken Coop Plans You can make using **chicken coop plans** for making your own coop is a great way to save money and get the right size and style chicken house you need for your flock. Building your own chicken coop is actually not very hard. You'll be surprised at how simple it is to make a good coop when you have easy chicken coop plans to follow.

Read on to learn more about chicken coop construction and plans.

The photo to the right shows a medium size coop with a built-in nesting box and roosting area. The chickens can scratch around on the ground during the day, or you can let them out of the coop when there are no chicken predators lurking about. The drawing below shows a much larger chicken house and attachable chicken run that gives a larger flock plenty of room to live and run around as they like. You can let them out of the run daily, simply by opening the door, to give them access to fresh grass. This gives you the benefits of free range chickens when it's convenient and the safety from predators when it's not.



Here is what that design looks like when it is built. There is ample room for many hens as well as a human-size door for access to the coop. It has a great set of nesting boxes, with exterior access to collect eggs quickly and easily without disturbing your birds.

This is truly a dream chicken house for raising backyard chickens. There is plenty of space so that when they are shut inside, they will be fine, and you can let them out during the day as your situation allows. An attached chicken run, like the one in the schematics above, would be ideal, with or without some yard time for free ranging / foraging during the day when you are home. While this is too big to be included in the category of portable chicken coops, it would be possible to make the run part movable and change up your flock's free range area that way -- by moving the exterior pen daily and rigging a wire mesh enclosure to go over the path to their outdoor area.

If you have a tiny flock or just intend to keep 2-3 chickens, small chicken coops provide the perfection option. There are many lightweight, portable designs for pint-sized flocks, and this is certainly a very economical way to go when it comes to housing your birds.

While some basic woodworking experience and prior power tool use is helpful, most chicken house plans are designed so that if you can read them, you will be able to build them. Enlist the help of a more experienced friend or hire a handyman to help with the framing if you have trouble doing it yourself -- you'll still save a large sum over purchasing the already-constructed chicken coops.

A small investment in good plans, your time, and appropriate building materials will yield a strong, adequate coop that will last years -- even decades -- providing affordable housing and protection to your chicken flock.

If you're interested in any of the coop plans for the houses pictured here, see Building a Chicken Coop to purchase them.

Want to read more about this topic? Check out our pages on:

Amish Chicken Coops: These Dutch quality coops are well-made and built to last. Find out where to buy and what design elements are superior.

Portable Chicken Coops: Chicken pens that can be moved about your yard make sense for small yards or where free ranging is not possible.

Backyard Chicken Coops: What elements go into backyard chicken coops,. and what are the advantages to eggs from your own hens versus those at the supermarket?

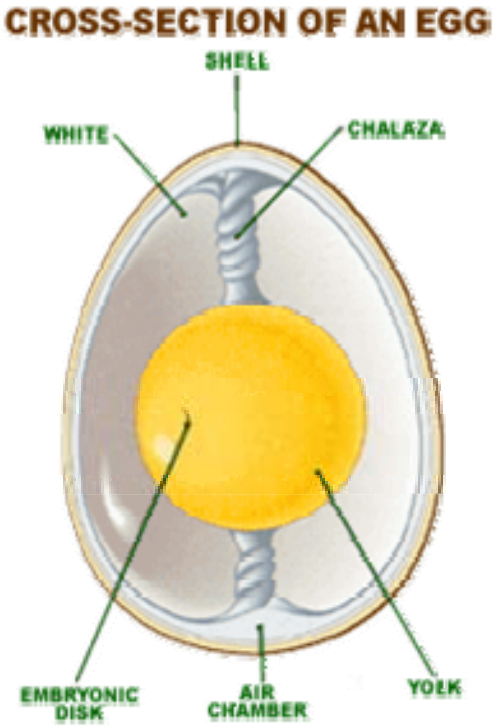
Chicken Coop Building Plans: For the do-it-yourself and frugal approach, learn about building a coop from easy-to-follow plans.

Chicken Coop Ideas: There are many ideas for fun and crazy chicken coops. Take a look at some fun pictures and get your creative brain working.

Finished here? Read below for chicken book recommendations, or go home to Egg Laying Chickens.

EGG GRADES

	Grade AA	Grade A	Grade B
Spreads	Remains compact	Spreads Slightly	Spreads over wide area
Albumen	Clear, thick and firm; prominent chalazae	Clear and reasonably firm; prominent chalazae	Clear; weak or watery
Yolk	Firm; centered; stands Round and high; free From defects	Firm; stands fairly high; practically free from defects	Enlarged and flattened may show slight defects
Shell	Clean; of normal shape	unbroken	Slight stain permissible Abnormal shape
Use	Any use especially frying, poaching and Cooking in shell	Any use especially frying, poaching and Cooking in shell	Baking, scrambling used in bulk egg products



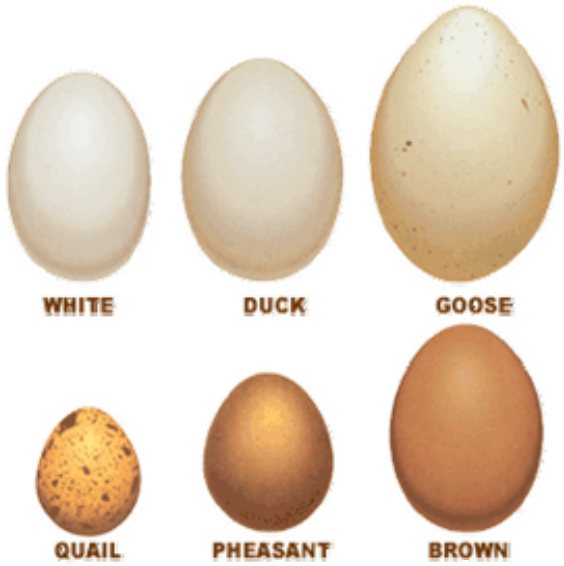
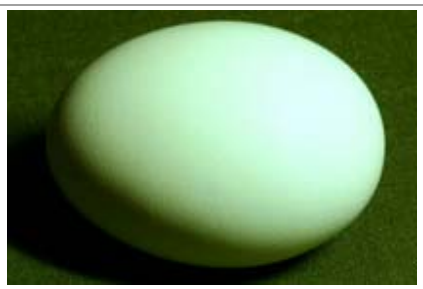
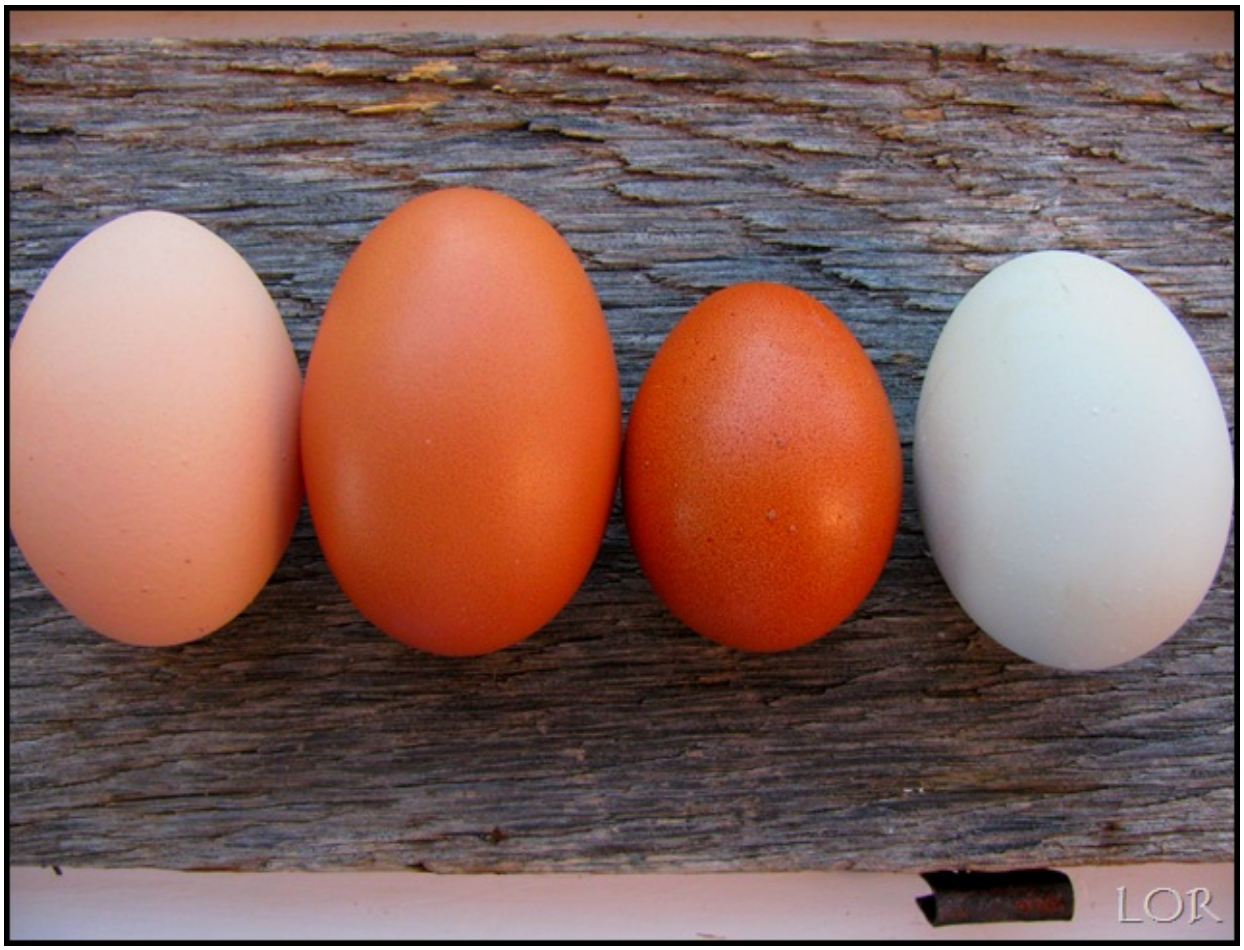


Image	Breed/Type Description	Weight*
	American Buff Goose Very large white egg	140gm
	Rouen Duck or Black and White Magpie Duck Large off-white/ slightly green egg	78gm
	Ameraucana Chicken Large green/blue-green egg	64gm
	Silver Phoenix Chicken Small light brown egg	42gm
	Sicilian Buttercup Chicken Medium white egg	54gm

	Black Langshan Chicken Large brown egg	60gm
	Silver Penciled Cochin Bantam Chicken Small brown egg	42gm

*The weight shown is the actual weight of the egg pictured; the group photo is also the group of the same eggs, to show the actual size/color differences.



Choosing And Storing Eggs Before Incubation

Before Incubation

It is important for eggs that are not to be incubated straight away to be stored correctly.

The Eggs

- Cracked, poorly shaped, soiled, thin shelled, unusually large or unusually small eggs should not be kept for incubation.
- Only select clean and undamaged eggs for incubation.
- Eggs should not be washed.
- Try not to handle the eggs too frequently.
- When handling eggs make sure that hands are washed to avoid bacterial contamination.
- Before incubation eggs can be stored for up to 7 days.
- When storing eggs before incubating, make sure that they are kept at a constant temperature of 13-18 degrees Celsius or 55-65 degrees Fahrenheit.
- Do not store the eggs at ordinary room temperature or in a refrigerator.
- Avoid placing the eggs in a draft when in storage before incubation.
- Store eggs with the small end facing down.
- Try to keep the eggs at the correct humidity prior to incubation which is a humidity of 70-80%.
- Make sure the stored eggs are turned twice daily before they are incubated.
- Keep the stored eggs in an egg carton and prop up one end at a 35 degree angle.

Healthy stock

It is important that eggs from only a healthy flock are used for hatching, as some diseases can be transmitted through the egg. The egg-transmittable diseases to be most aware of are salmonella infections, fowl typhoid and *Mycoplasma gallisepticum*.

Eggs laid by birds infected with disease may fail to hatch. Of those that do hatch, some birds may die during brooding, and the survivors may act as carriers and infect healthy chicks.

Do not add eggs from unknown sources to make up numbers, as you risk infecting your flock.

Breeding stock nutrition

The egg provides a complete food store for proper embryo development except gaseous oxygen, which enters the egg through pores in the shell. Breeding stock must be fed a well-balanced diet to fully meet the embryos' nutrient requirements.

The deficient nutrients are usually vitamins or minerals. A deficiency of these in the breeders' diet may not show any ill effects in the breeders, though hatchability may be affected, which is why different categories are fed specific diets. Nutritional deficiencies, such as a lack of riboflavin, are the main causes of embryo mortality during the middle stage of incubation (i.e. between the 12th and 14th days).

Hens' vitamin and mineral requirements for laying eggs are lower than those of breeders. The breeder's diet should begin six to eight weeks before hatching eggs are required, with particular attention to vitamin A, D3, riboflavin, pantothenic acid, biotin, folic acid, vitamin B12 and the mineral manganese.

Deficient nutrient	Result
Riboflavin	Leads to poor hatchability with a high incidence of malformed embryos, which are excessively moist
Pantothenic acid	Lowers hatchability and causes a high incidence of apparently normal embryos to die over the last two or three days of incubation
Biotin, choline and manganese	Leads to abnormal development of the embryo and a condition known as enlarged hock / slipped Achilles tendon
B12	Leads to a rapid decrease in hatchability and a progressively poorer survival of chicks that do hatch

Age of breeding stock

If the male bird is active, not too large or overweight, and fertile, his age has little or no effect on hatchability or the vigour of the chicks. The older the cock bird, the fewer hens he can mate effectively without loss of fertility. Fertility and hatchability also decrease, as the hen's egg production drops with age, and is highest during her first and second laying season.

Hatching eggs selection

It is important to consider the size, shape and shell texture when selecting eggs for hatching. Best results are obtained by setting eggs that are around the average egg weight for the type of poultry.

Since egg size is highly heritable, the rejection of small eggs will help to maintain good egg size in the progeny. Extra large or small eggs are a handicap in the incubator. The egg shape is hereditary, so continual use of badly shaped eggs perpetuates and increases this fault.

Only eggs with good shell texture should be used for hatching. Shell texture is not heritable; however, weak-shelled eggs may crack, enabling bacteria to enter or excessive moisture to be removed from the egg. Porous-shelled eggs increase the rate of moisture loss during storage and incubation. Hair cracks that are too small for the naked eye to detect can be found by placing a strong light behind the egg. Egg colour does not affect hatchability.

Collection and storage of hatching eggs

Embryonic development continues if fertile eggs are maintained above 20°C. Therefore, it is essential to collect eggs frequently and store them under cool conditions.

Eggs should be collected at least twice daily, and preferably three or four times. For best hatchability, eggs should be stored no longer than a week before setting.

The best temperature for storing hatching eggs is 10 to 16°C. Storage humidity is also important. Humidity below 70 per cent causes the eggs to lose excessive moisture. Below are the correct wet-bulb readings for a given humidity at the storage temperature. If you do not have a specific cool room, store the eggs in a cool, dry place. Eggs stored under conditions where the temperature and humidity vary tend to start and stop incubation, resulting in pre-incubation and lower hatchability.

Dry bulb	Wet-bulb reading		
	60% relative humidity	70% relative humidity	80% relative humidity
°C	°C	°C	°C
10	6.8	7.4	8.2
11.1	7.6	8.3	9.3
12.2	8.4	9.4	10.5
13.3	9.6	10.6	11.4
14.3	10.7	11.5	12.1
15.3	11.5	12.2	13.3

Other factors affecting success

Rough or careless handling when transferring eggs to the hatching compartment or prolonged delays during transfer, resulting in chilling, may cause embryo deaths.

Excessive inbreeding of poultry may result in lethal or semi-lethal genes, which also cause mortality during incubation.

Poultry: Reproduction & Incubation

http://msucares.com/poultry/reproductions/hatchmgt.htm

Hatchery Management Guide for Game Bird and Small Poultry Flock Owners

Five major functions are involved in the incubation and hatching of game bird and chicken eggs. The five functions are temperature, humidity, ventilation, egg turning, and sanitation.

The major topics below are explained in detail in the text.

Each of the five functions is important and may individually cause havoc in your attempt to hatch eggs if one is not conducted properly. When two or more are not controlled, it may be a disaster. Keep in mind, that changing or adjusting one of these functions may affect other functions and cause them to need adjustment as well. Therefore, changes in any one function should be made gradually and all functions should be watched closely for needed readjustment.

HATCHING TEMPERATURE

Most of the large commercial type incubators and hatchers are run at 99^{o}F (37°C). On the other hand, most of the smaller incubators and hatchers, like those commonly used by game bird producers, are run at 100^{o}F (38°C).

Temperature is the easiest hatching function to regulate, provided you have a good set of controls to work with and provided you check the heating mechanism regularly. Without good, sensitive, easy-to-regulate, and dependable temperature controls, you can have low hatches, poor quality chicks, and you can sometimes lose the entire hatch. If your incubators and hatches are large enough to justify doing so, you should install a temperature sensitive alarm to warn you of the potential danger to the developing embryos.

Temperature alarms are usually constructed of two temperature sensors. One is set to activate the alarm if the temperature drops below 97°F or 98^{o}F (36°C). The other sensor is set to activate the alarm if the temperature goes above 102^{o}F (39°C). This is a simple explanation of the temperature alarm and how it is installed, but even so, it is not all that difficult to install. If the machines are not in your home but are nearby, you may want to run a small wire (like speaker wire) from the machines to an alarm in your house so that you can monitor the machines at night also.

Incubation Periods & Incubation Operation Characteristics
(Table 1)

Item	Chicken	Turkey	Duck	Muscovy Duck	Goose	Guinea	Peafowl
Inc Period (days)	21	28	28	35-37	28-34	28	28-30
Temperature* (^{o}F, dry-bulb)	100	99	100	100	99	100	99
Humidity (^{o}F, wet-bulb)	85-87	84-86	85-86	85-86	86-88	85-87	84-86
No Egg Turning After	18th day	25th day	25th day	31st day	25th day	25th day	25th day
Open Vents Additional ¼	10th day	14th day	12th day	15th day	1st day	14th day	14th day
Open Vents (if needed)	18th day	25th day	25th day	30th day	25th day	24th day	25th day

* For Forced-air incubators. Add 2-3^{o}F. to the recommended temperatures if using a still-air incubator.

Incubation Periods & Incubation Operation Characteristics
(Table 2)

Item	Pheasant	Bobwhite Quail	Coturnix Quail	Chukar Partridge	Grouse	Pigeon
Inc Period (days)	23-28	23-24	17	23-24	25	17
Temperature* (^{o}F, dry-bulb)	100	100	100	100	100	100
Humidity (^{o}F, wet-bulb)	86-88	84-87	85-86	81-83	83-87	85-87
No Egg Turning After	21st day	20th day	15th day	20th day	22nd day	15th day
Open Vents Additional ¼	12th day	12th day	8th day	12th day	12th day	8th day
Open Vents (if needed)	20th day	20th day	14th day	20th day	21th day	14th day

* For Forced-air incubators. Add 2-3^{o}F. to the recommended temperatures if using a still-air incubator.

Temperature fluctuations for short periods of time usually do not severely affect hatchability or chick quality because the temperature inside the egg changes more slowly than the air inside the incubator.

However, a consistently low temperature will result in a late hatch and decreased hatchability. The chicks may be large, soft bodied, and weak.

A consistently high temperature will result in an early hatch and decreased hatchability. The chicks may have short down (same results with low humidity) and have rough navels (not necessarily infected -- just abnormal closure). More chicks will be malformed, spraddled, weak, and small.

You do not want either, but if you have to choose one or the other, remember that high temperature is more harmful than low temperature. You can incubate eggs for three or four hours at 90°F (32°C) without killing many embryos, but a temperature of 105°F (40°C) for 30 minutes will kill many embryos. In general, the older the embryo at the time of the high temperature mishap, the greater the death loss.

Incubators can easily overheat when kept where the sun can hit them, such as in a hot, room on the west of the house or in a small building that is subject to heating up considerably during hot summer

afternoons. Machines in such conditions, when set near full capacity and with improper ventilation will almost surely overheat. This statement does not imply that the incubator should not be set to full capacity; on the contrary, other factors must be considered and corrected before you can take full advantage of the incubator's capabilities.

HUMIDITY IN THE INCUBATOR AND HATCHER

Most people think the wet bulb reading in a hatcher or incubator is percent relative humidity. This is, of course, not true. Percent relative humidity is determined by using both dry bulb and wet bulb readings. For example, if the dry bulb reading is 100°F and the wet bulb reading is 87.3°F, the relative humidity is 60%. Under normal conditions the relative humidity in an incubator or hatcher should always be 57% to 60%. The following table gives the percent relative humidity figures for various dry and wet bulb readings.

Wet Bulb Temperatures for Relative Humidities				
	Dry Bulb Temperature, °F.			
Rel. Humidity	99°	100°	101°	102°
°F., Wet Bulb Temperatures				
45%	80.5	81.3	82.2	83.0
50%	82.5	83.3	84.2	85.0
55%	84.5	85.3	86.2	87.0
60%	86.5	87.3	88.2	89.0
65%	88.0	89.0	90.0	91.0
70%	89.7	90.7	91.7	92.7

Incubator and hatcher manufacturers offer various suggestions for dry and wet bulb settings.

However, you may find by experimenting with various settings that the best way is to simply run the dry bulb at 100°F and the wet bulb at 85 to 87°F. (Keep as near to 86°F as possible.) Use these settings from the first day of incubation until hatching is complete.

There will be no need to vary the humidity level from 86°F if the hatching eggs were gathered and stored properly to prevent excessive moisture loss before setting, if the temperature in the machines was maintained at 100°F, if eggs were turned frequently, if sanitation was good, and if your ventilation was properly adjusted during incubating and hatching. Attempting to increase the wet bulb reading to 90 or

92°F may decrease hatch if vents on the incubators and hatcher are closed too much. Closing the vents may increase the wet bulb reading and humidity inside the machines, but the developing embryos suffer from poor ventilation.

Old, dirty, too short, and wrong-sized wicks on wet bulb thermometers can cause erroneous readings. It is essential that wicks be kept in the best condition. You should thoroughly clean the wicks weekly and replace them with new ones after four to eight washings. Regular changing of wicks is often thought to be unnecessary; it may not be, but if the relatively small cost of new wicks is compared to the cost of low hatchability caused by incorrect wet bulb readings, the new wicks are justified every time.

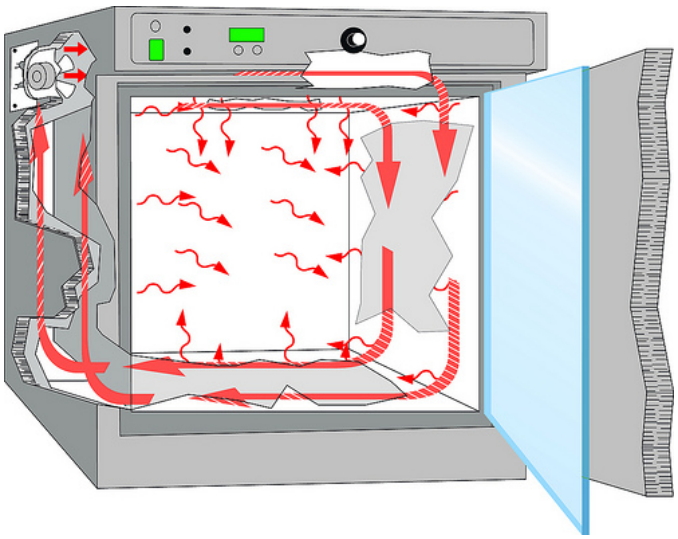
Inferior wicks tend to give higher readings than are actually present. In other words, the wet bulb tends to act more like the dry bulb. This is because the flow of water through the wick has been slowed. Therefore, if attempting to maintain an 86°F wet bulb reading with faulty wicks, you may actually have an 84°F wet bulb environment in the machine. The two degrees difference for an entire incubation and hatch period can noticeably reduce hatchability. Where possible and practical, use a dual set of wet and dry bulb instruments in each machine.

Excessive moisture loss from the eggs during storage before setting can produce the same symptoms that low humidity in the machines produces. A sign of low humidity is sticky embryos during pipping and hatching that result in embryos not being able to turn themselves in the shell and complete the act of pipping and detaching themselves from the shell. Low humidity also results in short down on the chicks, malformed, malpositioned, weak, and small chicks. Low humidity contributes to (but is not wholly responsible for) spraddlers, star gazers, and those that cannot stand, walk, or orient themselves well enough to reach food and water.

If several large, soft bodied, mushy chicks are observed that make it through pipping and hatching but are dead in the tray, it is a sign of high humidity. A bad odour usually accompanies this condition. The condition normally occurs only in incubators and hatchers that have forced spray humidity systems that force too much moisture into the machines. Rarely does humidity run too high in a machine that relies on evaporation from pans if you are using the recommended evaporative pans, if the temperature is correct, and if the machines are properly and amply ventilated with fresh air.

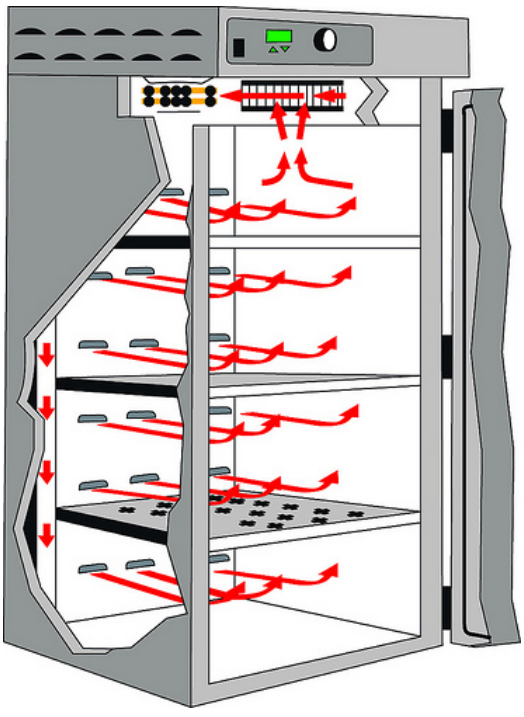
If by restricting ventilation the humidity is made too high (92° to 94°F) during the final stages of incubation, the embryos are moist and develop to the 19th, 20th, or 21st day of incubation, but die in the shell from suffocation. This suffocation results from improper ventilation rather than high humidity.

VENTILATION OF INCUBATORS AND HATCHERS



Ventilation is important in incubators and hatchers because fresh oxygenated air is needed for the respiration (oxygen intake and carbon dioxide given off) of developing embryos from egg setting until chick removal from the incubator. The oxygen needs are small during the first few days compared to the latter stages of development.

Egg shells contain three to six thousand small holes, called "pores", through which oxygen passes from the air to the developing embryo and through which carbon dioxide passes from the embryo to the outside air. The embryo's lungs are not developed during early embryonic development to the point that they can accommodate respiration by breathing. Respiration, therefore, is provided during the first three to five days by the vitelline blood circulation plexus growing from the embryo. To reach this plexus the gaseous exchange must travel through the egg pores and the albumen (egg white) to reach the vitelline circulation, which lies on the surface of the egg yolk. After the 4th or 5thday of development another structure, called the "allantois," grows from the embryo, extends through the albumen, and positions itself just underneath the egg shell. The allantois becomes the primary respiratory organ of the developing embryo and remains such until just before pipping begins. The transfer of respiratory function from the allantois to the lungs begins three or four days before pipping. The transfer is gradual and is completed by the time the chick finishes pipping the egg shell.



The important thing to remember about embryonic respiration is that ventilation is important throughout the incubation process, especially toward the end, because the embryos are larger and respiring at a much higher rate than in the beginning.

So how should you set the dampers (air inlet and outlet regulators) in your incubator? Since there are so many different makes and models, it would be too difficult to attempt to recommend a procedure for each one. Instead, here are some general guidelines for proper ventilation:

- The air exhausted from a hatcher or incubator should be vented (ducted) to the outside of the building. This is especially true if the incubator is located in a closed building or a small room. Such a venting system, if properly installed, provides added assurance that fresh air is available to the developing embryos. Nearly all of the large commercial poultry hatcheries are set up with this type of venting system.
- Small, home-type incubators are usually not designed for easy installation of vent ducts and, therefore, are seldom used. Instead, one may find four or five incubators operating in a 10'x12' room, exhaust air spilling into the room, and intake air being pulled in from the same room. Sometimes all the windows and doors will be closed to, as the owner says, "help hold the heat and humidity up in the incubator."
- Restricting the room ventilation may help with temperature and humidity control, but ventilation suffers. In such an instance, the incubators are only able to circulate the stale, expelled air back through the machine that the embryos reuse for respiration. Recirculating stale exhaust air through the incubators can be reduced by placing the incubator in a large room with a few openings, or in a small room with a number of large openings (windows or doors). The best way is to either duct the used exhaust air outside and provide enough openings for fresh air to enter the room, or to provide plenty of openings for fresh air to enter and stale exhaust air to easily escape.
- The largest amount of air exchange is needed toward the end of the incubation period because the embryos are larger and respiring more.
- On large commercial incubators the dampers are always in the motion by slowly opening or closing unless they reach the point of being fully open or closed. Temperature inside the incubator regulates the opening and closing motion. If the thermostat is set on 100^{o}F., the dampers begin to open when the temperature is above 100^{o}F., and begin to close when the temperature is below 100^{o}F. (The dampers are set so they never completely close.) With this method of control, the dampers tend to remain near the closed position during the winter months when colder air is being brought into the incubator. Conversely, during the late spring, summer, and early fall months, the warmer intake air usually causes the dampers to stay about half to full open. This same pattern fluctuates on a day-to-day basis in the spring by cool nights and hot days. During early embryonic development less heat is given off by the embryo and, therefore, the dampers tend to close more than they would be with embryos in the latter stages of development.

The summary explanation for manual damper setting in single stage incubators is as follows:

1. Provide more ventilation as the embryos grow larger and as the outside temperature increases.
2. Provide approximately the same total size intake and exhaust openings (some incubators have one intake and two or more exhaust openings).
3. Give as much attention to proper ventilation as you do to temperature, humidity, etc.
4. Provide a way to get rid of the exhaust air, especially in small closed type incubator rooms, so that the machines can take in fresh clean air.

5. If multiple egg settings are made in the incubator, causing the embryos to be in various stages of development, environmental changes have the greatest influence on the need for damper change. Unless the intake air is quite cool, the damper openings should not be set more than one-half closed if the machine is almost full of eggs.

How can you tell if ventilation is poor?

The first thing noticed may be a poor hatch. Lack of proper ventilation can contribute to low hatchability if, after examining numerous dead embryos in the shell, the following conditions are observed:

1. The majority of embryos reach the 19th or 20th day of incubation.
2. They are not dehydrated.
3. They are not malpositioned.
4. The unabsorbed egg yolks appear to be disease free.
5. The wet bulb reading usually ran closer to 90°F. rather than 86°F.
6. The heating element is seldom on during latter stages of incubation.
7. The dampers are not as open as expected.

EGG TURNING

Birds, including chickens and quail, turn their eggs during nest incubation. Nature provides nesting birds with the instinct and we know turning is necessary in incubating machines to attain full hatching potential of the eggs.

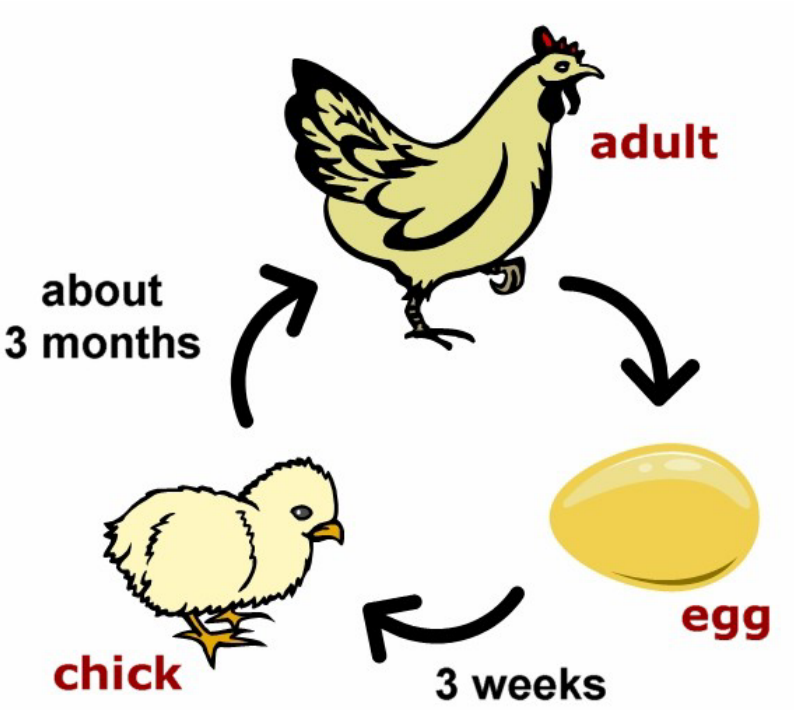
Do you know why egg turning is necessary for good hatching?

The albumen (white) of an egg contains virtually no fat particles and has a specific gravity near that of water. The yolk, however, has a relatively high fat content. Fats and oils have specific gravities lower than water and float on water. The egg yolk tries to do the same thing -- float on the albumen. If an egg is left in one position, the yolk tends to float upward through the albumen toward the shell.

The developing embryo always rests on top of the yolk. When an egg is turned, the yolk turns in the albumen so the embryo is again positioned on top of the yolk. Nature probably does this so the embryo is always in the best position to receive body heat from the mother hen sitting on the eggs.

If the egg is not turned, the yolk tends to float upward toward the shell and pushes the embryo nearer the shell. If the yolk travels rises enough, the developing embryo is squeezed between the yolk and shell. The embryo can be damaged or killed. Turning the egg causes the yolk to be repositioned away from the shell, making it safe for the developing embryo until time to turn the egg again.

Strands of twisted albumen extend from the yolk into the albumen toward both the small and large ends of the egg. These strands are called chalazae. They help keep the yolk away from the shell. The chalazae hold the yolk firmly in the egg's centre until egg quality begins to deteriorate, as when an egg is placed in a 100°F (38°C) temperature incubator.



As the albumen becomes more watery, the chalazae lose their ability to hold the yolk in place, making it more important to turn the egg often after incubation begins. In general, the need for turning begins when eggs are set and remains until two or three days before the eggs begin pipping.

In large commercial incubators the eggs are turned automatically each hour, 24 hours a day. Eggs in small incubators in the home sometimes get turned only twice a day, once in the morning and again in the evening. If manual turning, it is best to turn the eggs for an odd number of times each day (i.e., 3, 5 or 7 times). The longest period that the egg remains in one position is during the night hours. Turning an odd number of times will alternate the nights that the same side of the egg is uppermost.

Some producers open an incubator, pull out a flat tray, and run their hands over the eggs. This, to them, is turning the eggs. Actually it is only stirring the eggs, because there is no definite way to tell if the eggs are just rolled around or if they actually end up in a different position. Many of the eggs may not get turned at all -- just rolled around. Turning eggs in this manner can also crack the egg shells. Many chicks develop in eggs with cracked shells (only the shell, not the membranes) but not many will pip and completely hatch because dehydration occurs and makes the environment sticky. The chick doesn't have enough strength to pip and free itself from this sticky environment.

If using a relatively small incubator, you work away from home, and can turn the eggs only a few times a day, mark X on the top side of each egg with a pencil or felt tip pen. Each time you turn the eggs, visually check to see if each egg is actually turned by making sure the X ends up on the opposite side from where it was before turning. If using a machine that turns the eggs automatically, the eggs should be turned at least once every two hours. If the turning system is manual, turn as often as practical. Try to allow an equal time on each side.

Eggs should not be turned within three or four days of hatching. Chicks need to position themselves for pipping and do this better if allowed to remain still while that process takes place. The embryo is large

enough by this time that it has used most of the yolk for food and is no longer in danger of being squeezed between the yolk and shell.

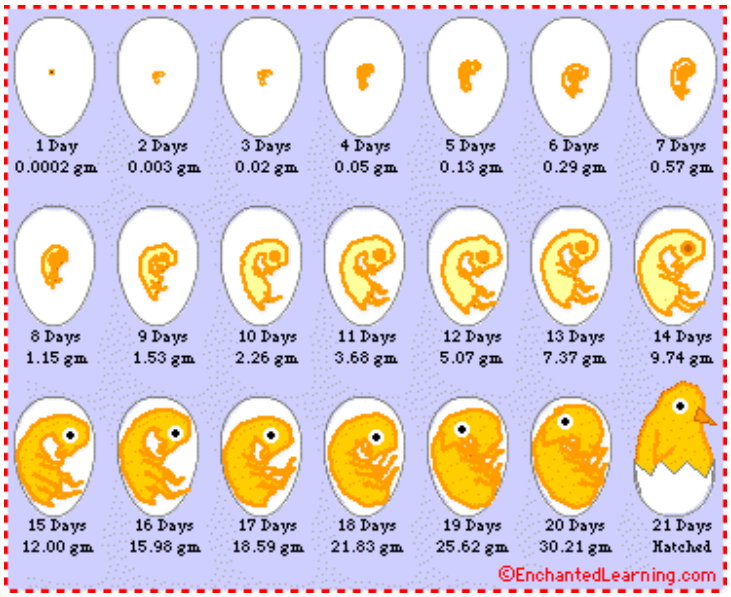
HATCHERY SANITATION

All incubator factors like temperature and humidity can be operating just right but poor hatchability can result because of poor sanitary practices. Poor sanitation causes not only poor hatch but subsequent early death loss during brooding. It can also cause a lingering morbidity problem that sometimes affect the birds during the grow-out period. Losses during the brooding and grow-out period caused by poor hatchery sanitation can cause more monetary loss than the loss from poor hatchability.

Let's assume you are setting clean, well cared-for eggs.

The most important tools available for use in cleaning and disinfecting an incubator and hatcher are water, detergent, and elbow grease. Some people mistakenly think disinfecting agents are the answer to their problems. They think disinfectants can replace poor cleaning, but this simply is not true.

Remember this: It is almost impossible to disinfect a dirty environment. Why is this statement true? Because all disinfectants lose much of their effectiveness as soon as they come in contact with organic matter; the dirtier the surface being sanitized, the less effective the disinfectant being applied.



Some disinfectants are more effective in the presence of organic matter than others. Cresol, cresylic acid, and coal tar disinfectants are the most effective disinfectants in the presence of organic matter. Since they are corrosive and emit noxious and toxic gases, they are not normally used in incubators, but in cleaning and disinfecting bird houses and pens.

The most commonly used disinfectants in the hatchery are quaternary ammonia compounds (quats), multiple phenolics, and iodophors (iodine compounds).

Quaternary ammonia may be the most commonly used disinfectant for equipment like incubators and hatching trays because quats are relatively non-irritating, non-corrosive, of low toxicity, and reasonably effective in the presence of organic matter. Since the incubator and its components should be cleaned free of organic matter before applying a disinfectant, quats are a good choice.

Many hatcherymen use multiple phenolics. They have a wide germicidal range, low toxicity and corrosiveness, reasonably good effectiveness in the presence of organic matter, and good residual effect. The disadvantage is that multiple phenolics can cause a burning effect on the skin of anyone handling

them in a strong solution or during a relatively long period of time. If using multiple phenolics at concentrations greater than the solution strength suggested on the label, wear rubber gloves for protection.

Iodophores have wide germicidal activity, good effectiveness in the presence of organic matter, and cost less than quats or multiple phenolics. The disadvantages are that it stains, is corrosive when in acid solution, and has only a slight residual activity.

A thorough cleaning job using plenty of elbow grease results in a 95% to 99% microbial removal. In such case, and when done often enough, little or no disinfectant is needed (assuming you are setting clean eggs). If, on the other hand, you are using a quick "hit or miss" system and a long time passes between thorough cleanup jobs, you are most likely falling short in disinfecting your machines. It is best to use a disinfectant following cleanup and maybe between cleanup jobs.

Fumigation is another method of disinfecting and is helpful when the cleaning is poor, the eggs are dirty, or the machines are filled with eggs, thus making it difficult to empty and clean properly. With clean eggs, machines, equipment, and intake air, fumigation is not needed.

The Global Egg Industry

http://new.dpi.vic.gov.au/agriculture/animals-and-livestock/poultry/egg-production

The number of layer hens in the world is estimated at 5690 million in 2006 producing just over 66 million metric tons of eggs. Asia, the largest egg producing region, produced 42.4 million tons in 2006 with China, the Worlds largest egg producer, produced just under 30 million tons (44.9% of the global egg production). Europe produced around 10.1 million tons while North America produced just over 8.2 million tons (FAO Database, 2006). Australia is ranked 41st in terms of egg production with approximately 13 million layers producing 164,000 tons of egg. The figure 1 pie chart shows the top 10 egg producing countries compared to Australia and the rest of the world.

The Australian Egg Industry

General

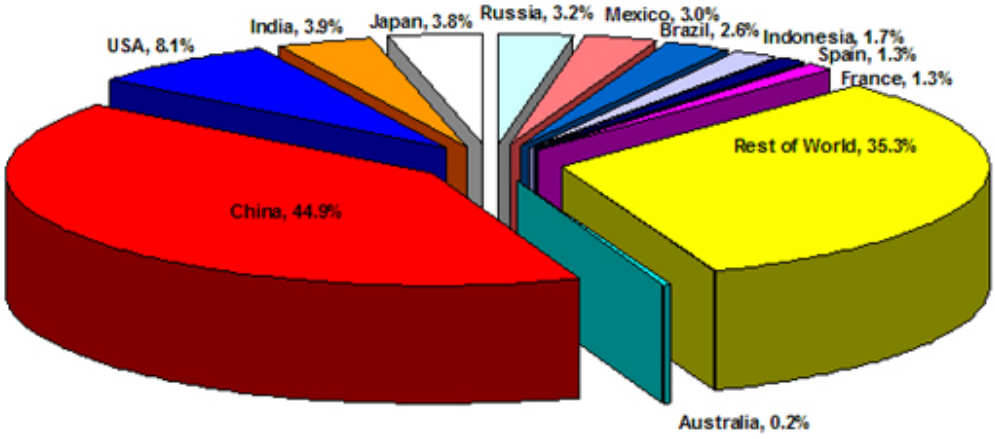


Figure 1 – Split of world hen egg production (FAOSTAT, 2006)

The commercial egg industry in Australia developed in the 1920's and has progressed to the stage where in the 2004/2005 financial year the number of eggs produced in Australia was 203 million dozen eggs year (AECL). The national flock as at the 30th of June 2005 was approximately 13.2 million hens (ABS catalogue 7121.0). Gross value of egg production at the farm gate for the year ended June 30, 2005 was $288 million while the gross value of production at wholesale was $327.9 for the year ended June 30, 2005 (ABS catalogue 7503). The majority of eggs are produced in commercial operations but it was estimated that in the year ended 30 June, 1999, 318 million eggs or 26.5 million dozen eggs were produced in non-commercial backyard operations (ABS catalogue 4306). This number of eggs equates to approximately 1.4 million non commercial hens. It is likely that the number of eggs produced in non commercial operations has decreased significantly with the demise of the backyard poultry house.

Egg Marketing

The main egg market in Australia is the shell egg market which accounts for approximately 80 - 85% of all eggs consumed. The remaining eggs are sold as processed egg products, which encompass a range of value added products such as egg pulp, liquid white, liquid yolk, dried egg yolk, dried white, boiled eggs, peeled eggs, omelette mix and scrambled egg mix. In Australia an increasing proportion of eggs are being processed into egg products due to the growth in the processed food sector and the growing demand for convenient custom prepared product.

Free Range Systems

Free range production systems provide birds with the ability to range or move around in both in-door and out-door space. Birds can nest, dust bath, perch and move freely. Birds are exposed to natural light in addition to artificial light. Free range systems account for about 15% of Australian supermarket shell egg sales. The average commercial free-range flock consists of 1,000-2,000 hens but there are now free range farms with as many as 50,000 – 120,000 birds.

Free range eggs are more expensive to produce for several reasons:

- Greater area of land required.
- Increase labour input per bird.
- Higher feed consumption.
- Reduced productivity compared to cage systems.
- Increased mortality due to a range of factors including risk of viral and bacterial disease being introduced by wild birds and rodents, exposure to predators such as foxes and eagles, and increased risk of parasitic disease.
- Increased risk of social competition.
- Increased number of floor eggs.
- Absence of economies of scale in grading, packaging and distribution compared with the cage industry.

Barn Lay Systems

An alternative system in the Victorian egg industry is the barn system, which is modelled on developments in Europe. It is basically an automated deep litter system whereby birds are free to move within a shed but not permitted outside. This eliminates the risk of predators such as foxes and eagles and also reduces contact with wild birds which may carry disease. Birds can nest, dust bathe, perch. Like free-range systems, barn systems have some disadvantages including reduced productivity compared to cage systems, increased risk of social competition which can reduce welfare and increase the incidence of mortality, and increased number of floor eggs. Barn produced eggs accounts for approximately 6% of Australian supermarket shell egg sales. The key to the viability of these systems has been the development of automated nesting systems facilitating efficiency in egg collection while minimising floor eggs.

There are about 4 of these systems operating in Victoria (as at November 2003) with varying degrees of investment in automation. Shed sizes are up to 10,000 hens. The RSPCA has recently examined this option as an alternative to cages and has accredited all of these Victorian farms.

The challenge for barn systems will be to identify the major limitations, such as equipment and management, and push the barn lay sector to comparable biological performances as seen in caged hens. If the efficiency of these systems can be improved the prices of eggs from barn systems will decline and, thus, market share is likely to increase.

At this stage consumers have a limited understanding of the relative merits of the Barn system verses Free Range systems and are influenced by the traditional and aesthetic appeal of Free Range.

BURNS

http://www.kwikwap.co.za/mjy/docs/BURNS.pdf

A young man sprinkling his lawn and bushes with pesticides wanted to check the contents of the barrel to see how much pesticide remained in it. He raised the cover and lit his lighter; the vapours inflamed and engulfed him. He jumped from his truck, screaming. His neighbour came out of her house with a dozen eggs, yelling: "bring me some eggs!" She broke them, separating the whites from the yolks. The neighbour woman helped her to apply the whites on the young man's face. When the ambulance arrived and when the EMTs saw the young man, they asked who had done this. Everyone pointed to the lady in charge. They congratulated her and said: "You have saved his face." By the end of the summer, the young man brought the lady a bouquet of roses to thank her. His face was like a baby's skin.

Healing Miracle for burns.

Keep in mind this treatment of burns which is included in teaching beginner fireman this method. First aid consists to spraying cold water on the affected area until the heat is reduced and stops burning the layers of skin. Then, spread egg whites on the affected are.

One woman burned a large part of her hand with boiling water. In spite of the pain, she ran cold faucet water on her hand, separated 2 egg white from the yolks, beat them slightly and dipped her hand in the solution. The whites then dried and formed a protective layer.

She later learned that the egg white is a natural collagen and continued during at least one hour to apply layer upon layer of beaten egg white. By afternoon she no longer felt any pain and the next day there was hardly a trace of the burn. 10 days later, no trace was left at all and her skin had regained its normal colour. The burned area was totally regenerated thanks to the collagen in the egg whites, a placenta full of vitamins.

http://casaveneracion.com/are-raw-egg-whites-effective-treatment-for-skin-burns/

First of all, there are degrees of skin burns. From Mayo Clinic:

First-degree burn

The least serious burns are those in which only the outer layer of skin is burned, but not all the way through. The skin is usually red, with swelling, and pain sometimes is present…

Second-degree burn

When the first layer of skin has been burned through and the second layer of skin (dermis) also is burned, the injury is called a second-degree burn. Blisters develop and the skin takes on an intensely reddened, splotchy appearance. Second-degree burns produce severe pain and swelling…

Third-degree burn

The most serious burns involve all layers of the skin and cause permanent tissue damage. Fat, muscle and even bone may be affected. Areas may be charred black or appear dry and white…

According to Snopes:

Regarding the rest of the e-mail, fire fighters are not instructed as part of their training to treat burns with egg white. Instead, they learn at-the-scene first aid procedures, which mostly amount to keeping airways open, reducing the temperature of burned areas, then handing off burn victims to medical professionals.

However, that firefighters aren't being taught to slather burn victims with albumen doesn't mean that at one time providing exactly that treatment wasn't a somewhat recommended practice. We happened upon sightings in turn-of-the-century medical journals that advocated the use of egg white on minor burns. Now, granted, most of those sightings promoted such use as a way of shielding injured areas from contamination (that is, using egg white to create a protective barrier between wound and air), but there was also suggestion that the application of this substance would take the pain out of the injury. (Mind you, those selfsame journals also offered up the information that a number of other wet, dense dressings, such as olive oil or a mixture of baking soda and water, would act just as effectively as a wound protectant and calmative for minor burns.)