



SUSTAINABLE EGG PRODUCTION

LIVESTOCK PRODUCTION GUIDE

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The ATTRA publication Sustainable Chicken Production discusses several poultry production models in detail, including free-range, pastured poultry, semi-intensive, chicken tractor and others. Sustainable Egg Production is a companion publication which discusses adapting these pasture-based models for egg production; many small-scale producers also raise layers in the traditional chicken coop.

Layers need nestboxes with adequate bedding and, if you want to maintain egg production during the winter, winter protection along with extra light. Layers prefer to have roosts. Egg production may look attractive to some producers due to the lack of slaughter and a ready market for eggs; however, the most economical way for small-scale producers to dispose of spent hens is by slaughter and sale as stewing hens.

Refer to one of the many books available on small-scale poultry production for general information on layer management, including rate of lay, flock replacement, controlled lighting, molting, economic efficiencies, etc. Gail Damerow's book A Guide to Raising Chickens (1) has a useful discussion of eggs (i.e. egg collection, quality, safety, storage, etc.)

Industry-focused books such as Poultry Science (2) have useful sections on egg inspection and quality.

Egg Production in the Pastured Poultry Model

Joel and Teresa Salatin (3) developed the pastured poultry model—a floorless field pen moved daily to fresh pasture—which has mainly been used for broilers. However, they are using it more for layer production in the past few years. Joel Salatin's book Pastured Poultry Profits (4) has a brief section on using the model for layers.

The Salatins raise about 2000 layers per year (1500 in pastured pens and 500 in "eggmobiles"). The eggs in the pastured pens cost about 50¢ per dozen to raise.

The layers are fed a balanced concentrate ration, but they eat 30% less feed concentrate since they are in pastured pens.

The eggs bring in a premium—about \$2.00 per dozen—since they are farm-fresh and raised in a natural setting with wholesome feed. The yolks are brighter than store-bought eggs, and they hold together better in a pan. According to

Salatin, the bakery items made with these eggs stay moist and fresh twice as long.

Salatin retrofits his standard 10' by 12' pastured pen for layers and hangs nestboxes inside the pen. An 18-inch-wide hinged top (across the 10-ft dimension) opens for egg-gathering from 10 nest boxes attached to the top of the pen. The nest boxes are 12 inches deep and 12-inches wide. They are separated by 6-inch partition boards. If the nestboxes were not separated, then the layers would all lay in one spot and break the eggs. The nestboxes are about 12 inches off the ground. A perch board is lowered during the day, but pulled up at night to prevent the birds from roosting in the nestboxes at night. His thirty pens are placed alongside each other in a pasture with up to 50 layers in each.

Although the nestboxes add to the weight of the pen, it is still possible to move them by hand with a dolly. Producer Skip Polson uses plastic milk cases as a lightweight substitute for the wooden nestboxes. He hangs the boxes with the open side up, after cutting an access hole for the hens on one side (5).

Salatin uses Rhode Island Reds for pastured pen production. The "old-fashioned" type is better for pastured pen production than the "improved" production type, because, although it produces fewer eggs, it is less high-strung. Each bird should produce about 21 dozen eggs per year, which could sell at \$1.50 to \$2.00 per dozen.

Salatin expects a pen of 50 birds to produce 36 eggs per day during their first year of production. If they do not lay more than 50%, they do not pay the feed bill (6). However, during their second year, they produce less although the eggs tend to be jumbo-size. They keep the birds for two years because it can be difficult to market spent hens.

Labor is needed everyday to move the pens to fresh pasture and refill feed and water. It is important to gather the eggs two times per day in order to keep them from getting dirty.

Washing the eggs can take a lot of time and reduces their "bloom" which keeps them fresh longer.

Problems include some incidence of pecking problems because the birds lower in the pecking order cannot run away in the confining pen. Some egg-eating also occurs because the birds do not have a lot to do. They are generally secure from predators in the pens.

Winter management is important because birds are kept for two years, going through one molt in that time. In Virginia, the birds would probably survive on the pasture during the winter but would not keep laying. At the Salatin farm, layers are housed in a 20'x120' hoophouse during the winter. Although the hoophouse is unheated, composting deep litter provides some warmth. Egg production still falls by about 25%.

The hoophouse costs about \$2000 to construct (or \$1.00 per bird for 2000 birds). A neighbor of Salatin's used hog panels and plastic to build a makeshift greenhouse. Although the hoophouse works well in Virginia for housing layers in the winter and maintaining significant egg production, in colder climates, more substantial or heated housing and lighting may be necessary.

Salatin integrates the hoophouse with other farm operations. Rabbits are also moved into the hoophouse during the winter and kept in wire cages. Below the cages, a wire covering over the rabbit droppings keeps the chickens out of the manure bed which is used to produce worms. However, the chickens are allowed to roost on the wire during the day and add fertilizer. In the spring, the animals are removed and the hoophouse is used for vegetable production.

Since the birds are not on pasture in the winter, the yolks do not retain the bright color from eating forage. Salatin increases the amount of alfalfa in the diet and has experimented with sprouting grain in the greenhouse. His customers accept the fact that for the four winter

months the eggs will be fewer in number and, although still a fresh, high-quality product, their yolks are not as bright as they are the rest of the year.

Batches of replacement pullets arrive twice per year. It is important to coordinate pullet production with egg demand, since pullet eggs are small for their first two months of laying and more difficult to market. Salatin does not market these eggs—he sells them informally to customers dropping by the farm and gives some away as free samples. Chefs, however, provide a good market for small and/or cracked eggs.

Marketing spent hens is important. On the conventional market, spent hens bring very little—about 10¢ per bird. However, Salatin is able to net about \$5.00 per spent hen by processing them on-farm and direct-marketing them as flavorful stewers to customers for \$1.25 per pound. Salatin processes stewers regularly along with his broiler processing, since it would be more difficult to market large batches of processed stewers.

The pastured pen layer model is ideal for small acreages. If a producer has a larger acreage more than 50 acres), he/she may want to consider the “eggmobile.” However, Salatin says the pastured poultry pens only net \$3 per day with layers compared to \$7 per day with broilers (6).

Free range: The “Eggmobile”

Joel Salatin developed a popular free-range model called the “eggmobile.” It is briefly described in his book Pastured Poultry Profits (4). The 20' x 12' egg-mobile, built on a trailer hitch and housing 100 layers, is generally moved to fresh pasture every three or four days. Since the egg-mobile follows a beef cattle rotation, the layers pick apart cow dung pats for fly larvae. (Salatin deems this model worthwhile even if it were solely for fly and parasite control for the cattle.) The birds range for insects, gradually foraging to a maximum of about 200 yards from the egg-mobile. Whole

grain supplement is provided cafeteria-style inside the egg-mobile. Allowing birds to forage on pasture reduces concentrate feed costs by 70% (4). Housing costs are also reduced—since the layers only stay inside the egg-mobile at night, one square foot per bird is enough space. The birds generally lay their eggs in the egg-mobile instead of outside; birds are locked in at night. In cold weather, bales of hay are added for bedding. Predators are not a problem, probably because of the frequent moves. The egg-mobile may return to a plot of land after just one month. An egg-mobile of this size requires a lot of acreage (about 50 acres); however, large egg-mobiles in particular, work well in combination with other livestock grazing operations.

This model costs less than the pastured pens to operate; the eggs only cost 25¢ per dozen to raise. The lower cost is due to the fact that less feed is used and whole grains are fed instead of a mixed ration. Corn, wheat, oystershell, and meat scraps are offered cafeteria-style, so the birds choose what they need. If, for example, the birds have been eating a lot of grasshoppers on pasture, they may consume less of the expensive meat scraps. If a producer were interested in certified organic production, this model could make costly organic feeding more feasible. Whole organic grains could be purchased and fed without the additional processing costs of grinding and mixing into rations. A further advantage of feeding whole grains is that nutrients that are lost during grinding are retained.

Compared to layer production in the pastured pens, labor is lower with the eggmobile, because feed and water do not need to be refreshed daily. The eggmobile is easier to move since it is pulled by a tractor and does not need to be moved daily.

Since the layers only visit the eggmobile to eat, lay, and sleep, losses from pecking order disturbances and egg-eating are less. Eggs can be gathered less frequently since the eggs do not get as dirty. The egg quality seems to be even higher with the eggmobile since the birds' diets

are so varied. However, predation is more common with the eggmobile than with the pastured pens. If a neighbor's dog attacks, 50 birds may be lost instead of 10.

Salatin's eggmobile currently holds about 200 layers. Since the birds only stay inside the eggmobile at night, one square foot per bird is sufficient space. Since the moving and servicing of the eggmobile is a fixed cost (6), the cost-effectiveness of production can be increased by building a bigger eggmobile for more birds, but the eggmobile becomes unwieldy to move. He put 270 layers into his 12'x20' eggmobile in 1997 and it worked fine, but he is working on a model to house 400.

Salatin plans to move the layers from his field pen pastured poultry operation into the eggmobile during their second year since it costs less to maintain them there. Also, since predation losses are higher for the eggmobile, at least they would be older hens that are lost. When the layers are newly placed in the eggmobile, it is important to wrap poultry netting around the bottom of the eggmobile the first night so they learn to go in. Salatin believes that the eggmobile offers the best quality egg from a nutritional and taste standpoint. The color of the yolk does not fluctuate as much according to the season as they do with the pastured poultry field pens. The yolks from the eggmobile model always have a rich color.

Labor considerations have to be made when comparing the two models. The eggmobile, like the pastured poultry model, is shut down during the winter. The pastured pens have to be moved and serviced individually every day. To move the eggmobile, it takes at least 30 minutes to start up a tractor, drive to the site, hitch, move, unhitch, and drive home.

There are other models of free-range layer production in existence. Blue-prints for a portable coop are available from University of California Extension (7). Bishop wrote Protected Free-Range: Moveable Henhouse with Free-Access Range Run for Single-Sire Flock of 25 (8).

Semi-intensive layer production

"Semi-intensive" refers to permanent housing with access provided to a yard or pasture. An example is the layer operation of Ohio farmer Herman Beck-Chenoweth (9). He houses 500 layers in a barn and allows them access to range any day when the temperature is at least 15°F. He suggests putting up a perimeter fence about 1000 square feet around the barn and subdividing this area into at least 4 paddocks. Anytime more than 20% of a paddock begins to show bare ground, the birds should be rotated to a new paddock. The system is described in more detail in his book Free-Range Poultry Production and Marketing (10). Entrepreneur David Wilson (11) currently raises layers in a semi-intensive model. He led an effort in the early 90's to establish ranged broiler production (with a French broiler breed). He produces "specialty" eggs.

See the ATTRA publication Sustainable Chicken Production for a more in-depth description of the semi-intensive model where it is discussed for broiler production.

Innovative: Chicken Tractor

The "chicken tractor", developed by Andy Lee and discussed in his book The Chicken Tractor (12), is designed to be integrated with vegetable production. It is a floorless pen, usually 4'x10', enclosed with chicken wire and a covered top as protection against the weather. About 10 layers are kept in a pen this size. The pen is moved daily on fallow beds.

When using the chicken tractor model, many producers add a small house to the chicken tractor to provide more protection from the weather and keep the nestboxes in there. The house may need to be on wheels to ensure it is portable. Andy Lee finds that layers prefer to have their nestboxes at least 6 inches off the ground. Virginia producers Vicki and Charley Dunaway found that layers got bored in the chicken tractor and pecked each other, especially with the stationary use of the chicken

tractor (13). The Dunaways attached a large corral to the chicken tractor in which the layers roam during the day.

Coops

Joel Salatin (3) also has experimented with a loose-housed bird production model. One model he uses is a house which combines rabbit production with chickens. The rabbits are kept in wire cages and the chicken scratch through the rabbit droppings, aerating the deep litter bedding, and producing compost. Salatin believes indoor flocks should consist of no more than 300 birds. He also believes that stocking density should be no more than one bird per 3 square feet. Otherwise, the manure load exceeds the bird's ability to scratch it into the deep litter. The advantage of this model is low labor compared to the pasture-based models.

A "composting chicken house" is discussed in the ATTRA publication [Sustainable Chicken Production](#).

When developing an egg production model on your farm, remember it may be helpful to refer to books on poultry and egg production for more layer management information. Several books are listed in the Resource Section of [Sustainable Chicken Production](#). Also, see the companion ATTRA publications [Feeding Chickens](#) and [Processing and Marketing Chicken Products: Meat and Eggs](#).

Summary

There are several pasture-based models and innovative coops for poultry production which are adaptable to layers—the producer must decide which is the most appropriate model for his/her farm.

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