

### Lesson 3: Production

The production and management of poultry products is one of the most specialized agricultural systems. Everything from housing to feed is the result of decades of research that has helped make the commercial poultry industry a very efficient, high-yield business.

#### Production and Management Practices

The four major commercial production systems are broiler production, turkey production, egg production, and pullet production for replacement purposes. Each system features specific management and production practices to reach maximum profitability. The commercial poultry industry has developed into a system referred to as vertical integration. Vertical integration is when two or more stages of the production, processing, and distribution are controlled by a single firm. For example, feed manufacturers and processing plants (referred to as the contractor) provide the financial needs and control management decisions while producers/growers provide the facilities and labor.

Broiler production is well suited to assembly line techniques. As a result, broiler production has developed into a highly integrated industry with 99 percent of broilers produced under contract. A typical integrated firm will provide the chicks, feed, processing, vaccinations, supervision, and transportation. The producer/grower provides housing, grow-out equipment, (feeders, waterers, and brooder houses), utilities, labor, and management. With improvements in production practices, the time to produce a broiler has decreased thus reducing the feed consumption costs. Broiler units are highly automated for feeding, watering, lighting, and ventilation. Commercial slaughter operations are regulated by state and federal inspections.

Turkey production is following a trend of fewer but larger farms and processing plants. Traditionally, turkeys have been raised on the range, but confinement rearing with highly automated feeding and watering systems is standard. As with broiler production, turkeys are grown using the vertical integration system.

Layers used for egg production are being raised by fewer but larger flocks. Producers strive for maximum egg production at minimum costs. A good average for a high-producing strain is 285 to 310 eggs over a 12- to 14-month laying cycle. Layers are produced primarily on an integrated or contract arrangement. Environmentally controlled housing is used with regulation of the light and ventilation.

Replacement pullets can be raised by egg producers or they are purchased from pullet growers just prior to placing in the layer house. The trend is moving toward specialization with egg producers only producing eggs while other specialists only raise replacement pullets. Pullets can be raised on floors, in cages, or a combination of starting on the floor and moving to growing cages at 6 to 10 weeks. Sanitation is very important when raising starter pullets to avoid disease and contamination. Ages and strains of birds should not be mixed with other birds in the same house and all sanitation and disposal rules should be strictly followed.

#### Facilities and Equipment

Proper housing of poultry is important to achieve a healthy and productive flock. Also important is the convenience and ease of the producer to maintain the greatest profit. The major factors to consider in facility planning are temperature, moisture, ventilation, and lighting.

Small chicks are started in facilities referred to as brooders or brooder houses. All chicks, whether they are broilers or replacement pullets, will start in brooders. Special heating equipment is necessary to keep the chicks warm until well-feathered. Small, trough-type feeding and watering equipment suitable for day-old chicks is used. Fresh air must be provided but with no drafts on the floor. Lighting can be provided by either heating equipment or room lights.

Pullets can be raised in the same house used for brooding or they may be moved to separate housing. They may be grown in partial cage systems or complete cage systems. The partial cage system starts the pullets out on the floor for the first 6 to 10 weeks and then they

## **Introduction to Poultry Production**

are moved to cages. The complete cage system grows the pullet entirely in cages. Lighting must be regulated closely because it will affect the sexual maturity rate of the pullets. Feeders and waterers should be placed throughout the house in convenient locations. Pullets can also be raised on the range but this method is better suited for smaller flocks.

Layers used for egg production may be housed in cage systems or in open- or slat-floor systems. Cage systems are the most common method for commercial operations. Cage systems are typically multiple-bird cages usually holding 5 to 10 birds in one cage. Egg production in an open-floor system is not very efficient for commercial egg producers. Open- or slat-floor systems result in dirty or broken eggs, stress to hens competing for food, extra cost for litter, and more labor to collect eggs by hand up to three times a day. Laying houses must provide hens with adequate temperature and ventilation. Fresh, clean food and water may be provided automatically or by hand. Lighting must be closely regulated for optimum egg production with a minimum of 14 hours and a maximum of 17 hours of light per day. Laying houses also need to provide an egg room to hold eggs in a cool and dry environment while being held for market.

Broilers typically are raised in large confinement facilities. Single houses may hold 20,000 to 28,000 birds with .75 or .8 square feet allowed per bird. Partial house brooding is utilized with one end of the house restricted until the chick is three weeks old. This helps to maintain and monitor the heat available to the birds while they are young. After that, the chicks are allowed full range of the house. Automated feed and water is provided. Natural and artificial lighting is used.

Turkey poults are raised in clear-span, metal-roofed buildings. These buildings are built without poles through the interior area to make it easier to move cleaning equipment through the building and provide better ventilation. Brooding, growing, and finishing, or a combination of all, take place in the same building. They typically have dirt floors that are covered with an absorbent litter material.

## **Nutritional Requirements**

Poultry are very different from other farm animals in regards to their nutritional needs. Birds use nutrients every hour of the day. Egg production, in particular, places a high demand for nutrient use to produce an egg. The digestion system of poultry is very rapid and respiration and circulation are fast. Poultry grow at a rapid rate and are more sensitive to environmental influences. Body temperature is higher than other farm animals and they mature at an earlier age. These factors place a great strain on their nutritional needs.

In poultry, efficiency of production is directly related to proper feeding. Birds are fed complex rations containing the essential ingredients for maximum meat or egg production, fertility, and body maintenance. The feed system is composed of five nutrient classes: energy (carbohydrates and fats), proteins, vitamins, minerals, and water.

The energy provided by carbohydrates powers the movement of muscles and produces body heat. Extra energy is stored within the body as fat. Sources of energy include animal products, such as fats, and plant products, such as grains (yellow corn, oats, milo) and vegetable oils. Protein provides amino acids which are the building blocks for cell growth (i.e., bone growth, tissue growth, or egg production). Vitamins are made up of fat- or water-soluble organic substances that aid the birds in digestion, absorption, and metabolism of nutrients. They also regulate the formation and development of new cells. Minerals are inorganic elements that help the bird develop bones and eggshells. Water helps to absorb nutrients from the digestive tract and aids in metabolic reactions.

## **Wastes and Byproducts**

Manure, carcasses, and eggs are just a few examples of the wastes and byproducts produced by commercial poultry operations. An operation with 30,000 laying hens can produce 40 tons of manure a month or 480 tons a year. Proper handling, storage, and application of manure from poultry operations can protect water resources and increase profits of bird and crop enterprises. Animal wastes are an important source

of plant nutrients for crop production. Manure can also be dried and used as animal feed for other livestock. Dried manure is high in protein, calcium, and phosphorous.

Selection of a waste management system is based on location, size, type and use of cropland, number of birds, and type of housing. Typical housing systems include cages above dry or liquid pits, floors with litter, and outdoor ranges.

Cages with layers or pullets are in rows of decks. Manure falls through the pit directly or is scraped from dropping boards below the cages. Deep pit systems can develop into solid manure if kept dry enough. Air blowing across the pits dries the manure under the cages permitting solid manure handling. Manure is scraped or flushed with water from the pits directly to a spreader or to a storage area. If kept dry, manure can accumulate in pits for at least a year and often longer.

Broilers and turkeys are typically raised on concrete or earthen floors. Litter management includes removing caked manure from around waterers, stirring to increase drying, and adding new litter. Periodically, tractor loaders remove the manure-litter mixture and the area is cleaned and disinfected.

### Summary

Poultry production systems utilize facilities and nutritional needs that are the result of decades of research that help achieve optimal production results. Commercial poultry operations are generally operated on an integrated or contract arrangement. Facility planning includes controls for temperature, moisture, ventilation, and lighting. Nutritional requirements are extremely important to the health and growth of poultry. Chickens have a high demand for nutrient use. Feed and watering systems are typically automated and are part of the poultry facility system. Poultry wastes and byproducts need to be managed properly to avoid pollution of water resources. Manure can be used as fertilizer for crops and processed into feed.

### Credits

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<<http://www.agcom.purdue.edu/AgCom/Pubs/ID-206.html>>.

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