THE CHICKEN industry in the United States is a large commercial industry. It is a very sophisticated, business-oriented industry through vertical integration. This has allowed the poultry industry to become very efficient in every aspect of the production and processing of birds and eggs. It has also allowed for producers to work with companies to raise high-quality poultry products.

Objective:

Check

Compare and contrast the four areas of the chicken industry.

Key Terms:

- in-line system
- litter
- molting
- off-line system

Chicken Industry

Broiler production, egg production, replacement pullet, and broiler breeder are the main categories that make up the dominant form of poultry production in the United States. Many of these poultry farms will look similar from sizes of environmentally controlled barns to automated equipment that eases the work load. Poultry farms will have bulk feed storage bins, tractors, manure spreaders, and generators. These farms operate with strict precautions against diseases. Some operations use a foot bath at the entrance of each house or require special clothing and rubber
boots to prevent disease contamination. Other operations do not require any visitors on-site. Vertical integration has allowed for the chicken industry to focus on these areas and design a production system that is optimally efficient.

**BROILER PRODUCTION**

Producing meat is the main focus of the broiler production area in the chicken industry. This form of production concentrates on growing meat birds by the fastest and most efficient method possible. Producers will enter into a company contract, receive birds from a hatchery, and generate broilers to market weight in about six weeks.

**Broiler Facilities**

Broilers are typically raised in specialized buildings that are completely opened inside, allowing the chickens to roam the entire area. Broilers are not raised in cages. These buildings offer automated heating, ventilation, water, and feed systems. The floor used in a broiler production building is an earthen floor that is covered by “litter.” Litter is an absorbent material that serves as bedding.

**Broiler Production Practices**

Cleaning after every group is essential to ensure a clean environment for young birds. Disinfecting walls and equipment will prevent disease contamination. Also, removing all old litter and spreading about 2 to 4 inches of clean, dry bedding on the floor helps prevent disease. Waste management is a key production practice that must have a particular plan even before poultry buildings are built.

Water quality is a very important factor in raising high-quality, healthy birds. Some operations use water treatment plans to guarantee the safest, cleanest water for their growing birds.

When young birds arrive, temperatures should be set at 90° to 92°F, feed in place, and a record keeping system be set. Once the birds start to grow, temperatures can be dropped to 65°F for an end temperature of production. The record keeping system will keep track of feed consumed and delivered, mortality, vaccination dates, and medications used. Following feeding schedules and maintaining all equipment during production should be top priorities for the operation.

**FIGURE 2.** Raising broilers in a temperature-controlled environment can help reduce potential health problems.
Daily care and observation of health are important steps to maintain a mortality rate of no more than 5 percent. Company representatives also help producers with feeding schedules and vaccination programs. This help from the company assures fewer risks for producers and allows them more time for maintenance of housing and equipment.

**Factors Affecting Broiler Production**

The factors that affect profitability in broiler production are bird weights, livability, contract agreements/payments, and cash operating factors like fuel, litter, electricity, maintenance, and repair. Proper maintenance of buildings and equipment by the producer instead of contracting these jobs out will help maintain lower costs. Other factors are consumer demand and market conditions. This will affect bird placement and schedules. The producer wants to have his or her buildings full at all times to provide a proper income. Environmental management practices, like litter distribution, dead bird disposal, air/water quality, and dust/odor management, can cause an increase in cost if the producer does not maintain a proper management system.

**Selecting Broiler Birds**

Selection of broiler chicks should come from a reputable hatchery and express quality broiler strains. It is common to only raise pullet chicks; however, cockerels will grow more rapidly. Pullets will carry more flesh over the back and breast than cockerels. This will give the pullets a more rounded appearance to the breast, thighs, and legs.

**EGG PRODUCTION**

Egg production involves the production of high-quality eggs for human use. Laying hens are housed in specifically designed cages in a sound, ideal environment. Typically, the eggs are collected, cleaned, and graded on-site. Producers maintain clean, well-efficient facilities and try to get one egg per hen each day.

**Egg Production Facilities**

Egg production buildings or layer houses also use automated heating, ventilation, water, and feed systems. These birds are housed in specially designed cages that offer comfort and good health to the hens. These cages provide a feeder tray and water nipple. Below the cages is an automated egg collecting system. This system allows eggs to be collected in a very efficient and sanitary manner.
**Egg Production Practices**

Raising layers for egg production requires attention to lighting, temperature, feeding, egg production, and egg collection. It is very important to provide hens an ideal environment to produce eggs. Control panels within the building control the lighting program for the hens. Light programs are important because the length of light hours indicates to the birds when to begin egg production. When hours of light are increased, hens are brought into production. The ideal temperature range for a shell egg layer house is set between 57° and 79°F.

Providing full feed to egg-producing hens is a general practice used in egg production operations. An important production practice is to ensure young pullets have reached a proper body weight before the onset of laying eggs. Producers should maintain healthy birds through constant, daily observation of birds, feeding amounts, and egg production. Records are essential to egg-producing operations and should be a top priority. During egg production, producers need to keep a watchful eye on the body condition of the hens. This will help the producer to decide when to molt the flock. A common production practice in shell egg layer houses is to induce molting. **Molting** is a period of time when the birds will shed and renew their feathers.

There are two types of egg collection systems used in egg production operations. The **in-line system** allows for laying, collection, and grading to take place at one facility. The **off-line system** transports the eggs out of the laying house directly to an egg cooling room and then transported to an egg processing facility. Most modern egg production operations use an in-line system. The egg is transported by a conveyer belt to the egg processing facility. The eggs are washed, inspected, and graded for packaging. Once packaged, the eggs move to a cooler room at 40° to 45°F and awaits shipment.

*FIGURE 4. Egg-producing hens are closely monitored to ensure proper health. (Courtesy, USDA)*

**FURTHER EXPLORATION**

**ONLINE CONNECTION: Cooking with Eggs**

Do you like to cook? Do you like to try new tastes, flavors? **Eggs** provide a very nutritious and delicious choice for cooking. **Eggs** provide a source of high-quality protein and 13 essential nutrients. **Eggs** are also a great source of riboflavin. **Eggs** are very popular on a breakfast menu. However, **eggs** can also be used in salads, appetizers, snacks, and on several different types of sandwiches. There are many different ways to prepare and enjoy **eggs**.

To find out more about cooking and the nutritional benefits of **eggs**, visit the link [http://www.aeb.org](http://www.aeb.org)
Factors Affecting Egg Production

The factors that affect profitability in egg production are contract payments/agreements and cash operating factors like fuel, electricity, maintenance, and repair. Other factors, such as hen productivity, feeding system, vaccination schedules, and molting, will also influence profitability. Companies provide assistance with feeding and vaccination programs. It is important to maintain an efficient system in an egg-producing operation. Producers must maintain all aspects of the process, as well as provide a clean, healthy environment for the hens.

Selecting Egg Production Birds

Selection for egg production should include the following characteristics: soft, enlarged comb and wattles; wide, moist vent; increased distance between the pelvic bones; increased distance between pelvic arch and keel; velvety skin; and soft, pliable, enlarged abdomen. Characteristics of a hen that is out of production would include the following: short, hard, shrunken comb and wattles; small, puckered, and dry vent; little distance between the pelvic bones; short distance between pelvic arch and keel; tight, coarse skin; and firm abdomen. There are many more detailed characteristics for hens in production and should be fully observed before selection.

REPLACEMENT PULLETS

Replacement pullets are raised for egg production. These pullets will replace hens in current egg production. The pullets are raised until they reach 20 weeks of age by the pullet producer. These birds are then transferred to an egg production site.

Replacement Pullet Facilities

Replacement pullets are raised in a building that is like a broiler house. The birds are grown in a similar environment and use similar equipment for feed and water. Once these birds are ready to come into production, they are moved to a layer house.

Replacement Pullet Production Practices

Common production practices include maintenance of facilities, feeding, and daily care of young, growing pullets. Pullet producers grow specially bred chicks for egg laying production. These chicks are hatched at a hatchery and are moved to a pullet production operation within a day or two of being born. The chicks have been vaccinated before arriving at the operation. Companies are very specific about vaccination programs and are generally overseen by com-
pany representatives. The producer should be ready for these young chicks with a clean, healthy facility. Feed and high-quality water should be ready and available.

The pullet production, sometimes referred to as the pullet replacement, operation will maintain these birds until they are 20 weeks of age. Once the pullet has reached this age, it will be transferred to a laying farm for egg production. Pullets typically are mature enough for egg laying at 24 weeks.

Maintenance of facilities is similar to the practices of a broiler operation. Cleaning, disinfecting, and providing a safe, healthy environment for the birds is a top priority. Temperatures are uniformly. Providing proper ventilation is a good production practice that will also help regulate appropriate temperature and remove excess moisture. Waste management is also a top production practice and should be set up before the birds arrive.

Following feeding schedules during production should be a top priority for the operation. There will be more time required during the early stages of growth. Daily care and observation of health are important steps to maintain a healthy and productive flock.

Factors Affecting Pullet Production

The most important factor in pullet production is producing a uniform flock with proper weights. The uniform flock will be more efficient, have a higher peak production, and will express their full genetic potential. It is the responsibility of the grower to ensure a uniform flock under ideal environmental settings, feeding, and care. Many companies will provide payment/contract incentives for uniformity and ideal body weight.

ON THE JOB…

CAREER CONNECTION: Poultry Careers

Ever wonder what a career in the poultry industry would include? There are so many different and exciting opportunities that are offered within the industry. A processing manager, a nutritionist, an engineer, a marketing specialist, or a geneticist all have a spot within the industry and all provide rewarding careers. Poultry science as a major in college with an emphasis on particular areas, such as marketing or nutrition, will allow a young person to enter into the poultry field. For more information on poultry careers, visit the link http://www.poultrycareers.org
Selecting Pullets for Replacement

Pullet replacement chicks should come from a reputable hatchery and express quality egg laying genetics and traits. As pullets grow, the producer should have sufficient knowledge in order to identify poor growth in birds. A good layer must have ideal body condition and attain the proper body weight to support egg production.

BROILER BREEDERS

Broiler breeders are chickens that are used to produce fertile eggs that will be hatched to become broilers. These chickens are selected based on genetic background and their potential to produce high-quality meat birds.

Breeder Facilities

Broiler breeder facilities need to provide an area for growing, breeding, and nest boxes. Some broiler breeder houses have two levels. The breeding, feeding area is similar to that of the broiler production house. The flooring is covered with litter, and the birds can roam the space. The upper level is designed for the nest boxes. This is where the hens lay eggs. These eggs are transported on a conveyor belt to the egg collection room. The eggs are boxed up and sent to a hatchery. Automated feeders and waterers are used.

Breeder Production Practices

There are specific production practices that must occur for high-quality birds to be bred and raised. Breeding bird production includes the daily care and feeding of the females and males, which are raised in separate buildings. These operations are contracted out by poultry companies to raise breeder chicks to adult birds.

The female and male birds are kept separately and raised similar to a broiler operation. The buildings provide a wide-open space for birds to roam. Automated feeders and waterers are used. Lighting in these houses is very important, because the number of light hours affect egg production. It is crucial to raise hens to a specific weight before production can begin. Once the female birds are 20 to 25 weeks old, they are moved into the breeder house. The females will move onto the nest boxes to lay fertile eggs. Once the egg is laid, it will be transported to an egg collection room by a conveyor belt. These eggs are boxed and sent to a hatchery.

FIGURE 7. Litter used on flooring is usually made of wood shavings.
It is very important to maintain a stress-free environment for these birds. Reproduction would suffer if anything interrupts their environment. Areas that are free of noise are an important factor to maintain a low stress environment, especially in the nesting area. Precisely controlled temperature and lighting systems are very important to maintain efficient production and reproduction in a breeder house.

Company representatives assist with the designed feeding program. Males and females are carefully controlled through feed intake levels, body weight, and condition. Producing pullets that are ideal in weight and condition will meet the goal of high egg production. Attention to the health of both males and females will ensure adequate fertility and production. Carefully controlled operations, along with well-detailed recordkeeping, will provide the producer a highly efficient return.

The producer must provide strict sanitation procedures for effective disease control. Cleaning and disinfecting the house and equipment are proper production practices. Maintaining adequate ventilation and clean, dry bedding will also result in cleaner hatching eggs. Temperatures in a breeder house typically range from 65° to 75°F.

**Factors Affecting Broiler Breeder Production**

Factors affecting profitability in breeding bird production are contract payments/agreements and cash operating factors like fuel, electricity, maintenance, and repair. Other factors, such as environmental settings, feeding system, vaccination schedules, and care, will also influence profitability.

**Selecting Broiler Breeder Birds**

Breeding birds are carefully selected and owned by companies. These birds will express high-quality meat and rate of growth. Some common assessments used to identify growth potential are skull width, heart girth, back flatness/length/breadth, body depth/capacity, breast and keel, weight, and color. A wide skull is an indicator of growth potential. A good heart girth and body depth/capacity will indicate enough space for internal organs that will maximize growth and development. Flat backs are a sign of good bone development. The examination of the breast and keel will determine good meat proportions.

**Summary:**

Broiler production, egg production, replacement pullet, and broiler breeder are the main categories that make up the dominant form of poultry production in the United States. Many of these poultry farms will look similar from sizes of environ-
mentally controlled barns to automated equipment that eases the work load. Poultry farms will have bulk feed storage bins, tractors, manure spreaders, and generators. These farms operate with strict precautions against diseases. Some operations use a foot bath at the entrance of each house or require special clothing and rubber boots to prevent disease contamination. Other operations do not require any visitors on-site. Vertical integration has allowed for the chicken industry to focus on these areas and design a production system that is optimally efficient.

In the modern poultry industry, companies supply the birds to the producers. Producers rarely, if ever, get a say in the type or source for the birds in production. Contract agreements are made between the company and the producer. Contracts usually state who will provide the birds, feed, medication, utilities, and labor. Identifying high-quality, superior birds is an essential step in each of the production systems. A good poultry producer will exhibit this knowledge and provide sound managerial skills and understanding of producing and preserving the quality of birds delivered.

**Checking Your Knowledge:**

1. What are the similarities and differences of broiler and replacement pullet production?
2. What is some common equipment used on all types of poultry operations?
3. In a contract agreement with a company, what are the common factors that affect profitability?
4. How can light affect the production of eggs?
5. What is the difference between an in-line system and an off-line system in egg production?
6. What are the key factors when selecting superior animals for each area in chicken production?

**Expanding Your Knowledge:**

Research the responsibilities of a fertile egg producer. What is the producers role in developing new strains or lines of breeds to improve egg production? How can DNA be used in the breeding and developing of birds within the chicken industry?

**Web Links:**

- **National Chicken Council**
  [http://www.nationalchickencouncil.com](http://www.nationalchickencouncil.com)
- **U.S Poultry & Egg Association**