GENERAL INFORMATION for the POULTRY PROJECT LEADER
BREEDS AND VARIETIES

When we talk about poultry, we are refering to all the birds we raise for meat or eggs. These birds include chickens, turkeys, ducks, geese, quail, pigeons, guinea fowl, partridge and pheasants. During this project, we will be talking mostly about chickens but most of the information is similar for all poultry.

People started raising poultry a long time ago. The first chickens were thin, tough birds called the Jungle Fowl. They lived in Asia more than 5,000 years ago, and may still be found today. Turkeys have been used for food in North and South America since people have been here. Ducks were first raised for food in China thousands of years ago. Muscovies, which are like a combination breed of duck, geese and turkey come from South America. Geese come from Europe and North America.

Today, there are many different breeds of poultry each of them raised for a special reason. In recent years, the main goal in poultry breeding has been to develop stock that is efficient in egg or meat production. Traditionally, the breeds of chickens raised to give us meat included Barred Rock, White Rock and Cornish. Certain lines or strains widely known for their commercial production have been established and have contributed to the rapid development of Canada’s present poultry industry. Today, however, most meat birds are commercial crosses of breeds such as White Rock and Cornish. Often, these commercial crosses are called Broiler Chicken.

Meat birds are sold as broilers, which weigh 2.0 kg (4.5 lbs.) or less, or as roasters, which weigh more than 2.0 kg (4.5 lbs.). In the past, chickens raised to lay eggs included White Leghorn (lays a white egg) and Rhode Island Red and New Hampshire Reds (lay a brown egg).

As with the meat birds, today’s commercial egg layers are commercial crosses of several breeds. Egg layers are usually selected by the color of eggs that they lay, (i.e., white egg layers, brown egg layers).

Many breeds of chickens are raised mainly for show. Some show breeds include:

- C Silkies
- C Cochins
- C Houdans
- C White Plymouth Rocks
- C Barred Plymouth Rocks
- C Rhode Island Reds
- C Brown Leghorn
- C Light Sussex

SELECTING YOUR BREEDING STOCK

To obtain eggs for hatching, a rooster must be present with the flock of hens. The rooster should be carefully chosen and with an eye for good colouring and feathering. The bird must meet breed standards as stated in the American Standard of Perfection. He must be active if his characteristics are to be passed on to his progeny.
In selecting the hens for the breeder flock, you must remember that you want only active, healthy, productive hens that meet all qualifications for the breed and are. Keep only the hens you are going to use for breeding purposes. To feed them is expensive and keeping more than needed for obtaining hatching eggs is troublesome. You may want to keep some hens for table egg production but remember heavier birds eat a lot more feed to produce fewer eggs than the small feed efficient leghorn breeds.

You should learn to distinguish between layers and non-layers. Ensure any hen you keep is a productive layer. The following distinguishes between layers and non-layers:

<table>
<thead>
<tr>
<th>CHARACTER</th>
<th>LAYING HENS</th>
<th>NON-LAYING HEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vent</td>
<td>Large, dilated, oblong, moist, bleached</td>
<td>Small, contracted, round, dry, pigmented</td>
</tr>
<tr>
<td>Pubic Bones</td>
<td>Wide apart</td>
<td>Close together</td>
</tr>
<tr>
<td>Comb</td>
<td>Large, red, full, glossy, warm</td>
<td>Small, pale, scaly, cold</td>
</tr>
<tr>
<td>Wattles &amp; Earlobes</td>
<td>Prominent, soft, smooth</td>
<td>Inconspicuous, rough, dry</td>
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</table>

Well cared for chickens will lay eggs for about one year. After your hens have laid eggs for a year, you may want to pick out the non-layers and dress them for eating. The entire flock should be replaced after twelve to fourteen months of production. The only reason to keep hens or roosters longer would be for show if no offspring were developed.

**BREEDING**

A couple of methods for breeding pedigree stock are used. One method is to let the rooster run free with the hens. You will need one rooster for each ten hens. It is a good practice to have two roosters available in case of any problems.
This type of breeding system does not guarantee top quality chicks because of less strict hen selection. However, if the other method of breeding is selected, hens will have to be selected. This is the method most poultry exhibitors use to ensure topnotch offspring. The hen should be selected as to breed standards and productivity.

For individual breeding of hens, a separate pen is required. Allow .3 square metres (3.5 square feet) per bird. The pen should have clean litter all the time and an open nest available along with water and feed. After placing the rooster with the hen, allow three days before saving eggs for hatching. By using your best male and best female, you will be ensuring hatching top quality chicks.

CARE OF THE EGG

Cleaning:
Eggs for table use or for hatching should be collected frequently, cleaned and stored. Use clean nest eggs for hatching purposes. Dirty eggs should be cleaned using either sandpaper, emery cloth or steel wool before storage. Washing eggs is not recommended for small flock owners, especially for hatching eggs. Table eggs can be washed in 46-48EC (115-120°F) water containing an egg detergent-sanitizer (ie., not a household detergent). Wash for no more than two to three minutes and allow for rapid drying and cooling. Never wash eggs in cold water.

Hatching the egg:
It takes some poultry eggs longer to hatch than others. For example, a chicken egg spends 21 days in the incubator before it hatches. A turkey or duck egg is there for 28 days, while a goose egg takes 30-31 days. A Muscovy egg stays in the incubator the longest. It is there for 35 days before it hatches.

Two ways to incubate an egg are with a broody hen or in an incubator.

Eggs for hatching should be collected three or four times daily. Avoid exposing hatching eggs to blasts of extreme cold or hot air, rain or snow. Hatching eggs must be cooled slowly to room temperature. After collection, hold the eggs at room temperature 21-24 EC (70-75°F) for three to four hours. To keep eggs fresh, store them in a refrigerator at 15-18 EC (60-65°F). Storing eggs in a low humidity refrigerator will allow the air cell to enlarge rapidly. Eggs should be kept at humidities from 70-80 per cent. Hatching eggs should be stored small end down until a number are available for setting.

Keeping hatching eggs more than seven days before incubation will reduce the chance for a good hatch. Hatching eggs should not be stored more than seven days before setting. If you have more eggs than you can use, dispose of them weekly, thereby guaranteeing top-quality eggs. Eggs over two weeks of age should not be used for hatching. Egg quality declines as the egg gets older. In hatching egg management, be concerned with prevention of bacterial or mold infection and controlling temperature and humidity.
**Incubation:**
If you are not using an incubator to incubate the eggs, a broody hen should be used. A broody hen is a hen that has stopped laying eggs so it can set on eggs to hatch them. Using a hen from your flock would be best. Broody hens are usually aggressive and cluck loudly indicating the urge to set. The best breeds for broodiness are the bantam breeds that have not had the broodiness instincts bred out of them.

To entice a broody hen to set, darken an area of the pen or a separate area where a nest with eggs is present. The broody hen prefers a darkened, comfortable, draft-free area. Allow 21 days from the time the hen begins to set on the eggs till the day the eggs will hatch. To break a hen of its broodiness, the idea is to do the opposite of what we did when you enticed her to set. That means making her uncomfortable, in bright light and having to move around.

**Incubators:**
Incubators are heated containers used to hatch eggs. The temperature inside a still air incubator should stay at 39°C (103°F) and for a circulating incubator, 37.5°C (99.5°F). A big hatchery can have between 14,000 and 100,000 eggs in incubators. Hatcheries that are this size use mechanized incubators but you can hatch eggs just as well in a small incubator.

**Embryo Development:**
A chick grows inside an egg the same way a gosling or duckling does and it does not matter if the egg is hatched naturally or in an incubator.

**HOW A CHICK DEVELOPS**

<table>
<thead>
<tr>
<th>Before egg-laying</th>
<th>Fertilization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Division and growth of living cells</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Between laying and incubation</th>
<th>No growth</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>During incubation:</th>
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<tbody>
<tr>
<td>Day One</td>
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<td>Day Two</td>
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<td>Day Three</td>
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<td>Day Five</td>
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<td>Day Eight</td>
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<td>Day Sixteen</td>
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<td>Day Seventeen</td>
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<td>Day Nineteen</td>
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<td>Day Twenty</td>
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<tr>
<td>Day Twenty-one</td>
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</table>
CANDLING EGGS

Eggs for table use are candled to check for cracked shells and to see the condition of the air cell, the yolk, albumen, blood spots or meat spots. Candling is done in a dark room with the egg held in front of a strong light that lets you see inside the egg.

Candling is also used to see if the eggs are fertilized and if they are, to check how the embryo is growing.

An egg candler can be bought or made. A suitable light can be made by cutting a hole 3.2 cm (1 1/4 inch) in diameter in the end of a coffee or juice can. Insert a light fixture through the lid, using a 40-watt bulb. The interior of the egg can be viewed by holding the large end up to the hole cut in the bottom of the can. As light passes through the egg, twirl the egg several times. If blood spots, cracks or embryo development is present, you can detect them.

White eggs should be checked for fertilization on the third day. Brown eggs should be checked on the fifth or sixth day because seeing the blood vessels before this is difficult.

If an egg has been fertilized, you can see a small reddish area with blood vessels running away from it. The embryo floating around inside the egg looks like a huge red spider.

If the embryo dies, the blood vessels break away and form a blood ring. All clear eggs and eggs showing blood rings or streaks should be removed from the incubator.

Remember to candle eggs in a darkened area. To check for fertility of eggs, you can readily see the development of blood vessels three days after setting by using the candler. Dead embryos can be detected early by a ring of blood around the interior of the egg.
KEEPING THE EGG HEALTHY

When you are incubating eggs, you have to:

C Keep the egg warm so the chick, or embryo, inside will grow. Temperatures for the incubator vary, a still air incubator has a temperature of 39°C (103°F) and a circulating air incubator has a temperature of 37.5°C (99.5°F).
C Keep the air inside the incubator moist or humid;
C Have good air ventilation inside the incubator but do not have it drafty;
C Turn the eggs regularly. This stops the chick from sticking to the shell. In a small incubator, the eggs should be turned at least four times daily. In large setters, the trays of eggs are usually automatically turned every hour. The eggs should not be turned during the hatching period.

BREAKING OUT

On the twentieth day of incubation, the chick pushes its head forward and breaks the shell membrane with its egg tooth, on the beak. The chick then starts to breathe the air in the air cell. This usually takes a whole day.

On the twenty-first day, the chick breaks out of its shell by using its beak to chip out of the egg shell.

HATCH DAY

The hatch day is an exciting day. Seeing your next generation of birds starting their life is quite an experience. These chicks can be left with the hen a day or two but should be removed soon and put in their own brooder. The broody hen can then be used to continue incubating other eggs.

THE 4-H POULTRY PROJECT

Most 4-H members are going to raise day-old chicks through to adult birds. Your responsibility will be to care for them as they grow and mature. Ensure chicks have lots of water and feed, stay warm and have a clean pen to live in. Observe the stages of growth and see that the birds are healthy. They may not speak either of the official languages, but their actions and performance will tell you, as an observer, whether they are comfortable, happy and healthy.
CHOOSING A BROODING PEN

Choosing a brooding pen is the very first decision a project participant must make. How much room does one need? This will depend on whether one plans to raise the chicks in the same pen as they are brooded. For twenty chicks, five square metres (50 square feet) are more than ample space to see them through to maturity. If one plans to keep stock over the following winter, the area should be small enough, with enough insulation that the birds will not freeze their combs. On larger farms with other livestock, finding a section that could be partitioned off may be possible. The other animals could help generate enough heat to keep the hens warm. In fact, if the barn is assured of always staying warm, one could put them in cages.

Let us assume that the birds will be brooded and raised in the same pen. The chicks will not require the entire room area for the first week or two. One can plan to construct a circular enclosure within the pen so that heat from the brooder will be more efficiently used.

Other parameters besides room space that must be used in choosing a brooding area. The room must be free from drafts for they will only cause condensation and litter problems that could also lead to health problems. It should be inaccessible to dogs and cats. Rats can also be a problem if there is a large infestation, but normally the brooding circle will discourage them. Wild birds can also be a danger to chick health. One never knows where they have been or what they may have been into so keep wild birds out. They are also carriers of lice and mites. Even older chickens should be isolated from day-old chicks.

Once you have found a room that meets all these parameters, then it is time to sanitize the area. **Brush all dust and cobwebs off the walls and ceiling. Scrape the floor clean.** If the area has been excessively dirty, **washing it out with a germicide/water mixture would be wise.** The mixture could be placed in a pail and then applied by dipping a broom in the pail and brushing it over the entire surface. Now that the pen has been cleaned of organic matter, one can apply an iodine-based sanitizer mixed in water. This can be applied in the same fashion as the germicide mixture. Allow the place to dry, then a thin layer of hydrated lime can be put over the floor.

The next decision is to determine what material will be used for litter. The most common are chopped straw and wood shavings. If you choose to use chopped straw or hay, ensure that it is not dusty or moldy because the fungus could cause respiratory problems among the birds. Litter should be evenly distributed over the floor, two to three inches deep.

Now that the building has been prepared, it is time to construct a circular enclosure. A circular cardboard ring should be built about .9 m (3 feet) in diameter but with enough overlap that it can be
expanded when the birds get older. The circle will prevent the chicks from wandering away from the heat source and eliminate any corners. Chicks huddle when cold and can pile up by crowding in the corners. Those that end up on the bottom of the pile will smother. The circle will prevent this as well as floor drafts if the cardboard is entrenched in the litter.

Once the circular enclosure is in place, it is time to put the heat source in place. Suspend an infrared heat lamp from the ceiling in the central area of the pen. The extension cord should be long enough that the bulb can come within approximately 30 cm (12 in.) of the litter surface. The lamp should be hung so that it can be adjusted upward as the birds get older. The heat source should be put in place twelve hours before the chicks arrive so the desired temperature can be reached and maintained. Ensure that the heat bulb is in the centre of the circle. Put a thermometer beneath the light and check to see if the desired temperature of 35-37°C (95-99°F) has been attained 5 cm (2 in.) above the litter surface.

**IMPORTANCE OF BROODING**

One of the best tests of a good poultry person is their ability to brood a batch of chicks successfully. The flock manager should visit the pen often during the first few days to prevent any trouble from developing. Trouble can arise at any time. A constant watch of chick behavior for the first two or three hours is essential. It is best if one can start brooding them in the early afternoon so that the chicks can get settled if they have come from a commercial hatchery. Let them find the heat, water and feed sources. Dip the beaks of the chicks in the water to insure they know water is available. The first few days of brooding are important in the life of the chickens as the conditions, or habits acquired, may affect future growth.

**HEATING AND TEMPERATURE**

Floor level temperatures of 34-36°C (93-97°F) are essential in brooders for day-old chicks. Maintain this temperature for a week. After this, you can lower the temperature about 3°C (37°F) a week until the temperature under the lamp is the same as the temperature in the pen. Pen temperatures from 18-24°C (64-75°F) are comfortable for most poultry stock.
When chicks hatch, their body temperature is the same as the incubator temperature. Soon it begins to rise and by 10 days the chicks reach their normal body temperature of 42°C (107°F). Heating the whole room is not necessary. The cold air in the room 'harden' the chicks. Room temperature may be 14-20°C (57-68°F) than what it is under the brood lamp. After the first week or ten days, one can drop the temperature by 5°C (41°F) per week until a temperature of 21°C (70°F) is reached. Chicks should be fully feathered before supplemental heat is removed.

Chick behavior is the best indication of their comfort. Cold rooms and insufficient heat under the brood lamp cause crowding which could lead to a high mortality rate. Mortality will vary with chilling or overheating. Chicks will suffer more from overheating than from chilling for long periods, but both cause digestive troubles and, if severe enough, affect growth. The chicks often develop diarrhea and mortality may continue for several days after the heat conditions are corrected.

A constant watch of chick behavior for the first two or three hours is essential. If the birds spread out in a circle at night at the outer edge of the lamp-covered area, then the temperature is correct. If they cheep noisily and huddle together under the lamp, then they are probably too cold. Overheated chicks move away from the brooder lamp and tend to crowd the guard circle trying to get away from the heat. They will pant with their beaks open and become listless.

**WATER**

Water is essential for good health. Birds can live a few days without feed but only hours without water. Baby chicks should be given water within 36 hours after hatching. If the chicks have had a long trip from the hatchery to your farm, put a powdered vitamin pre-mix in the waterer at the desired levels for the first few days. A one gallon plastic hand waterer is more than adequate for starting 20 chicks. Waterers with brightly colored bases help the chicks find the water. For the first few days take the chill off the water and have water available near each feed trough. If using a waterer built for adult birds, putting a ring of rubber hose in the base may be necessary so that chicks cannot fall in and drown. Rocks placed in the outer ring of the base can serve the same purpose. Waterers can be made using juice cans in combination with tin plates. Make two holes on opposite sides of the can about 2 cm (3/4 inch) from the lip. Fill the can with water and place on top. Tip them over and the waterer will maintain its own water level.
A continued supply of fresh water is important if chicks are to thrive. More than 60 per cent of a bird's body weight is water so it is a vital ingredient for all the body functions. Water is also one of the cheapest nutrients.

Water for chicks should be maintained at temperatures between 10-21°C (50-70°F). If it is outside this range, the chicks will reduce their consumption and not do as well. Generally, birds will consume water in a 2:1 ratio to feed consumption. This ratio can change if extremes of climate temperatures occur.

During the winter, the water will freeze in most small poultry houses. One of the most common methods of keeping the water from freezing with small flocks is to empty out the waterers at night and fill them with warm water in the morning. During hot weather, the hens' water consumption may double. Lack of water is one of the most common causes of health problems in both winter and summer.

The manager should know how much water is consumed daily. It is often a good indication of the bird's health.

When the waterers no longer can handle a half-day supply for the flock, it is time to either add more waterers or use larger waterers. One should keep raising the waterers as the birds grow so that the bases are level with the backs of the birds. This not only helps prevent litter from getting into the water supply but also discourages spillage. Place the waterers on stands so that the birds cannot get into any damp litter that may develop beneath the waterers. The water should be changed twice a day. The waterers should be cleaned with disinfectant once a week so that there is no slime buildup.

**FEEDING**

Start your day-old chicks eating when they arrive. Place the feed on egg flats, box tops or other easy to get surfaces. Baby chicks should be given feed within third-six hours after hatching to prevent loss of weight and vitality. Ensure that they have also found the waterer or feed consumption can lead to dehydration and eventual death. The chicks should be fed 20 per cent medicated chicks’ starter for the first six weeks. From six weeks to twenty weeks switch over to a 16 per cent medicated chick grower if being kept on for layers.

If the intent is to slaughter some or all the birds for eating then the birds can be switched to an 18 per cent finisher ration as early as 12 weeks. Two weeks on this ration should be ample time to put a proper finish on the carcasses.
Faulty nutrition can lead to tremendous costs. Relating the growing stages of a chicken to the type of feed used is important. Starters sold by reputable feed manufacturers are formulated to meet the nutrient requirements of the birds. Only starters should be fed during the first six weeks. Adding ingredients such as grains, skim milk or greens will only upset the balance of the ration's nutrients. By the end of the first week, the chicks can eat from the proper feeding equipment and the trays can be removed. Raise the feeders as the chicks grow so the top of the trough is level with the backs of the chicks. Manufactured floor trough feeders can also be purchased. The feed troughs and waterers should be arranged around the source of heat so as chicks can move to or away from the heat without piling up against the trough and smothering.

**CARE DURING GROWTH PERIOD**

During the growth period, besides feeding and watering, there are many other jobs to be done.

- Keep the pens clean. Manure should be removed at least once a week and clean shavings added as needed.
- The birds should be watched for signs of disease. (See section on DISEASES). Generally, you should check the birds to see if they are lively and the combs are bright and healthy looking. Observe how they behave and make notes on anything you find interesting.
- Fill feeders half full to avoid spilling out and ensure freshness of feed.
- Always keep feed in front of birds.
- Keep feed troughs free of litter and moldy feed.
- Both feather picking and cannibalism is common and can develop when the chicks are growing. A similar type of problem is toe picking that can start in a flock of chicks soon after they are put down under the heat lamp. Some factors that can cause this are overheating the birds, lack of feed and water and overcrowding.

**CANNIBALISM**

Feather picking and cannibalism are common problems that can develop while the chicks are growing or during the adult stage. Factors that can cause this are overheating, lack of or an imbalance of feed supply, overcrowding, boredom or sometimes, natural sunlight can cause it indirectly. The easiest and most satisfactory method of controlling cannibalism is cutting the bird’s beaks. De-beaking involves trimming slightly, more than one-half of the upper beak and blunting the lower beak. Do this only if the birds are picking one another. If de-beaking is needed, this is best done before the birds start to lay and should be done by 16 weeks of age. **Since the birds used in 4-H are for exhibition, we do not cut their beaks.**

Maintain proper temperatures in the pens so that cannibalism is not encouraged. The low fiber content of commercial feeds and the pellet or crumble preparation allows birds to consume their daily nutrient requirements in a short time. They may get bored not having to forage for food and could start pecking each other. Hanging cabbage heads or lettuce heads and putting a few spruce boughs in the pen can create the necessary diversion to prevent pecking. If the litter is kept dry, then sprinkling some oats on the floor will encourage the birds to stay active by scratching.
Ensure that the birds are not overcrowded. Close confinement can cause them to become aggressive toward each other. Make sure that there is also adequate feeder space.

A nutrient imbalance can cause birds to become cannibalistic. It is important that you give the birds a balanced ration. Commercial rations are formulated to be balanced to the birds nutrient needs. Switching to a feed, which costs less does not necessarily mean that you are getting a bargain. Be sure that it is not lacking an essential component such as protein.

Birds in pens with windows are sometimes more prone to cannibalism or feather picking. It usually starts on a sunny day when the sun’s rays penetrate the pen and the birds see the dust particles that are in the air. The particles land on another bird’s feathers and a bird trying to pick up the dust particle accidentally pulls a feather or draws blood. Therefore, using artificial light will prevent this.

Cannibalism can soon become a habit and be difficult to check sometimes. If the problem has started in your flock, the victim should be removed and injured parts painted with pine tar or another preparation with a bitter taste. Care should be taken that the preparation chosen does not burn the bird’s skin. Applying the preparation to a few of the uninjured birds in the pen is advisable. Cannibalism in small flocks is usually due to poor management.

PROBLEMS IN THE BROODER PEN

The poultry producer should watch for the conditions in the following chart when trying to prevent problems in the brooder pen.
<table>
<thead>
<tr>
<th>CONDITION</th>
<th>PROBLEM</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young birds are spread uniformly over the floor area and are at the</td>
<td>None</td>
<td>O.K.</td>
</tr>
<tr>
<td>feeders and waterers.</td>
<td></td>
<td></td>
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<tr>
<td>Birds are crowded along the perimeter of the chick guard or along the</td>
<td>Too hot</td>
<td>Lower Temperature</td>
</tr>
<tr>
<td>wall.</td>
<td></td>
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<tr>
<td>Panting and gasping</td>
<td>Respiratory disease or too hot</td>
<td>Lower temperatures if too hot, otherwise have a veterinarian examine a</td>
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<td></td>
<td></td>
<td>a few of the ill birds.</td>
</tr>
<tr>
<td>Birds are huddled to one side of a heat source.</td>
<td>Too drafty</td>
<td>Eliminate drafty conditions</td>
</tr>
<tr>
<td>Birds are huddled under heat source.</td>
<td>Too cold</td>
<td>Raise temperature</td>
</tr>
<tr>
<td>Birds are huddling and piling in small groups or in corners.</td>
<td>Too cold or too drafty</td>
<td>Raise temperature or eliminate draft conditions</td>
</tr>
<tr>
<td>Small, scrawny birds and some dead after two days of brooding.</td>
<td>Possibly dehydrated from not finding water</td>
<td>Check that all young birds are in close proximity of water and feed.</td>
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<td></td>
<td>and dying of thirst or starvation from</td>
<td>Ensure that lighting is adequate. Dip beaks in water when placed.</td>
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<tr>
<td></td>
<td>not finding feed.</td>
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<tr>
<td>Vent pasting, (fecal material sticking to the vent)</td>
<td>Birds could be too hot, too cold, or feed</td>
<td>Rise or lower pan temperature. Sprinkle some finely cracked wheat or</td>
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<tr>
<td></td>
<td>could cause laxative condition.</td>
<td>corn on top of feed if laxative condition.</td>
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<tr>
<td>Birds are crowded after six weeks of age.</td>
<td>There is not enough space causing unevenness</td>
<td>Provide more space</td>
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<tr>
<td></td>
<td>in size of birds.</td>
<td></td>
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<tr>
<td>Crowded feeders and waterers</td>
<td>There is not enough feeding and watering</td>
<td>Provide more feeders and waterers</td>
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<tr>
<td></td>
<td>space causing some birds to become thin.</td>
<td></td>
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<tr>
<td>Wet litter</td>
<td>Too many birds for space provided.</td>
<td>Provide adequate space. Also, provide good ventilation. If litter</td>
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<tr>
<td></td>
<td></td>
<td>very wet, replace with new litter material.</td>
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<tr>
<td>Strong ammonia odours</td>
<td>Poor air movement. Too many birds for space</td>
<td>Provide good ventilation.</td>
</tr>
<tr>
<td></td>
<td>provided.</td>
<td></td>
</tr>
<tr>
<td>Feather picking cannibalism. (Cannibalism is the habit of one bird</td>
<td>Causes unthrifty birds, injuries and</td>
<td>Provide plenty of space. Good ventilation. Reduce light intensity in</td>
</tr>
<tr>
<td>pecking at another)</td>
<td>mortality.</td>
<td>pen. If all else fails, trim beaks with an electric beak trimmer.</td>
</tr>
<tr>
<td>Birds have poor feathering and lack uniformity at five to six</td>
<td>Poor watering or feeding system or not</td>
<td>Provide good quality feed and water and increase space per bird.</td>
</tr>
<tr>
<td>weeks.</td>
<td>enough pen space.</td>
<td></td>
</tr>
</tbody>
</table>
MANAGEMENT

RECORDS

To ensure care and knowledge of your flock’s performance, records must be kept. Be sure to keep these in a convenient place and fill them in each day. Records help you remember what happened on any given day. Records of expenses and receipts are very important. The records help in determining the productivity and profitability of your flock.

Records to be kept should be:
- Daily egg production and mortality
- Number of cracked or broken eggs
- Date of setting eggs
- Number of eggs set
- Date of the hatch
- Number hatched and percentage hatched
- Amount of feed purchased and consumed
- Cost of feed and other expenses.

PREPARING THE PEN

Between flocks, the hen house should be thoroughly cleaned. Take the manure out and clean and disinfect the equipment and interior of the house. Make any repairs to the house or equipment at this time.

NESTS

The nest should always have clean litter. This will prevent dirty, cracked or broken eggs. Remove droppings, broken eggs and soiled material promptly and replace with clean nest material. Eggs should be gathered two or three times a day. Frequent gathering reduces the number of dirty eggs and improves the egg quality.

There should be at least one nest for every five birds. These should be .3 x.3 x.3 m (1 x 1 x 1 foot) and have a slanting roof to prevent roosting on it. An 8-10 cm (3-4 inch) board on the front will keep in litter. There also should be a perch in front of the nests and the nests should be 46-60 cm (18 inches to 2 feet) above the floor. The nest in the breeding pen can be a .3 metre square (1 foot square) box filled with clean nesting material.

LITTER

Many litter materials are used such as shavings, sawdust and chopped straw. During the winter, deep litter 10-15 cm (4-6 inches) is important. Wet litter or caked litter should be removed and replaced with clean litter to prevent dirty eggs. Do not remove dry, loose litter. During warmer months, less litter is needed which helps keep the building cooler.
FEED

A complete 16 per cent protein laying ration or breeder ration should always be kept in front of the birds. No other food is needed. If the feeder space is adequate, you will only have to feed once a day. When feeding, do not put new feed on old feed. Let the birds clean out the feeders once or twice a week. Never fill the feeders over half full. Feed wastage can reduce profits for your flock. Remember your greatest expense is feed. Give the hens all they want, but do not waste it.

Calcium is an important mineral needed by laying hens for egg shell formation. About 10 per cent of the egg weight is shell. The shell is almost 100 per cent calcium carbonate. Most of the complete high-energy laying mashes available contain 3.5 per cent calcium. Oyster shells, which are a good source of calcium can be fed to the layers to ensure they have adequate calcium. A granite grit or coarse sand helps the bird's digestion. They retain this for long periods so feeding every two weeks is sufficient. This grit and oyster shell can be fed in the mash feed. A handful or two is needed for each.

FACILITIES NEEDED FOR FLOCK

Housing requirements would allow for .3 square metres (3 1/2 square feet) per bird. This would mean 3.25 square metres (36 square feet) for ten laying hens or a 2 x 1.5 m (7 x 5 foot pen). A separate breeding pen for one rooster and one or two hens would also be required. The house must be waterproof and insulated for protection against drafts and cold in winter and to hold in existing heat.

An inlet for ventilation that can be open or closed, as the climate dictates, is necessary. There should be no windows in the laying pen. Supply light using a 25 watt incandescent bulb connected to a timer.

Much of the equipment can be homemade or second hand equipment can frequently be purchased. The feeders should be adequate to supply the days feed for the flock without wasting feed. Feeders should be 15 cm (6 inches) deep with a guard to keep hens out of the feed and a lip to prevent hooking out of feed.

A barrel, box or bin to keep feed in will help reduce feed wastage that occurs when feeding out of a bag. Also, the danger of rats or mice destroying feed is reduced.

A sketch of a feed hopper for layers is shown. The feed hopper should be 15-23 cm (6-9 inches) of roost per bird.
If the laying pen is large enough, a yard is not necessary. When hens are allowed into a yard to run, there is greater chance of loss from predatory animals and eggs will be dirtier. A yard should be fenced tight and the hens should be shut in the house during the night.

LIGHTING

The use of lights in the hen house is to stimulate the hen to lay. Light stimulates the pituitary gland, which in turn secretes hormones that stimulate the ovary of the hen to lay more eggs. Pullets need fourteen hours of light per day throughout their laying cycle. When the source of natural light decreases in the fall, additional artificial light must be used to ensure the birds continue laying productively and at the same rate. One light outlet in the center of the pen with a 25 watt bulb will be enough intensity of light for the hens.

VENTILATION

During the winter, all ventilation should be from one side of the hen house (preferably the south). Inlets that open or tip open at the top are best. These should be adjusted according to the weather. When the house is stuffy and the ammonia fumes are strong, it needs more ventilation. Always allow a little ventilation, close the hen house tightly only in severe cold. During the summer, ventilation will help cool the house. Increasing air movement in hot weather is important to keep good egg production.

RODENTS

Rats and mice must be controlled because they feed on the available feed. There are many rat baits available for controlling these rodents.

FLOCK HEALTH

Well cared for small flocks are not very likely to have many disease problems. However, trouble can occur even in these small flocks. One problem that may occur is lice or mites. These do not live on people or other animals. They do live on wild birds and these frequently carry them to your flock. Lice and Northern Fowl Mites live their entire lives on a chicken. You will see them in the fluff under the vent. The egg clusters can be seen attached to the base of the feathers. Red Mites live on and off the birds. They can be found under the roosts in the morning. Specks of blood suggest mites. For treatment, a 5 per cent Canbul dust can be used to dust the birds and the litter.

As far as vaccinations go, all commercial poultry producers vaccinate their birds for Merek’s, bronchitis and Newcastle Diseases. Any one of these diseases can cause serious loss of egg production or mortality in the flock. If your birds aren't vaccinated for these, be very careful in not allowing visitors around your flock. Caution should be taken when taking birds to shows. These birds should not be brought home or put with other birds because of possible disease problems. In our area, all show birds
are vaccinated for ILT (Infectious Laryngotracheitis). Contact your 4-H Specialist for dates of vaccination.

The habits of cannibalism, feather picking and egg eating are sometimes hard to stop. When an emergency arises, keep the hens busy by adding litter or feeding green feed, increasing area per bird, but the intensity of light or use another method to check the problem. Remember your show birds are never de-beaked.

If an occasional hen gets thin, sick and dies, it is probably nothing to be alarmed over. If the whole flock gets sick, starts to cough and sneeze, looks droopy, stops eating and suddenly stops laying; be sure to find out the cause. Some typical specimens can be taken to the provincial diagnostic laboratory for diagnosis of the problem.

DISEASES

Merek's Disease attacks the nervous system of the chicken and there is no cure once the bird contracts the disease. Flocks can become resistant to it but only after exposure and high mortality. Having vaccinated stock is best to avoid such hazards.

Coccidiosis is an internal parasite that can attack young birds. By maintaining dry litter, keeping the birds confined and feeding complete feeds with coccidiostat, there is no danger of suffering any losses from this disease. The disease not only causes high mortality in acute cases, but also stunts the growth rate of birds that are not as severely affected.

Purchasing birds from a registered hatchery ensures that the chicks will not have pullorum. As a precaution, all birds are tested for pullorum when they are vaccinated against ILT (Infectious Laryngotracheitis). ILT is a highly infectious viral disease that can devastate a flock, causing high mortality. The outbreaks occur most often during the fall and winter months, but can strike anytime. Vaccinations give the birds immunity to the disease. All birds in the flock must be vaccinated and there is a 30-day quarantine period. During this time, the birds should be confined. Do not visit other poultry owners or allow them onto your property for fear that the disease gets transmitted to unvaccinated flocks. Try to have adequate feed supplies on hand to last the quarantine period as entering farm supply stores during that period would be hazardous. The birds will be tagged during vaccination and their numbers recorded. All birds entering shows must have current tags as proof of vaccination if they are to be entered in exhibitions. Do not have any stock younger than two weeks of age at the time of vaccination. There should be no setting hens nor eggs hatched during the quarantine period. Do not buy, sell or trade any stock during the quarantine period.

If birds are kept confined in a properly sanitized room, there should be no problem with worms, lice or mites. There is no equal to good management in preventing disease. Good management means not only keeping clean facilities, but also ensuring that the birds are not stressed.
There could be a stress when the chicks are transported from the hatchery to your homes. Find out how long the birds have been in transit and when they were hatched. If there has been more than three or four hours of transit time, putting some vitamins and electrolytes in the chicks’ water supply for the first 48 hours would probably be best. Later, if a lack of colour or liveliness becomes evident in the flock, administering a vitamin-antibiotic mixture in the water might be advisable. Remember, stress usually predisposes sickness, so being attentive is best and always try to offer an ideal environment to the flock rather than try to offset poor management with drug supplements.

**EXTERNAL PARASITES**

birds. Their chief damage to poultry is through discomfort and irritation which lowers the birds’ resistance and makes them susceptible to other ailments. Lice multiply rapidly during warm weather. Steps should be taken to control them and, if possible, prevent their infesting your stock.

*Lice can be controlled by treating with an insecticide according to the manufacturers’ recommendations. **

**Common Red Mites:** Mites are small spider-like parasites that hide in cracks or filth close to where birds roost or nest. They crawl onto the chickens and suck their blood. The mite is grey in colour when empty and red when full of blood.

Common Red Mites multiply very rapidly; if nothing is done to destroy them, the poultry house is soon covered with them. They lower the vitality of the birds until they do not grow or produce eggs.

**Scaly Leg Mite:** The Scaly Leg Mite is a very small parasite that spreads slowly through the flock. It lives and works under the scales on the shanks and toes of the chicken. It burrows beneath the scales into the skin, causing irregular shaped eruptions or crusts to form on the shank.
**Mites can be controlled by treating with an insecticide. Follow manufacturer's recommendations.**

**DISEASES**

Signs of diseases or symptoms are as follows:
- Droopiness
- Ruffled feathers
- Loss of appetite
- Listlessness
- Diarrhea
- Laboured breathing
- A high death rate (mortality)

If disease is suspected, the club member should call the club leader, poultry specialist or a veterinarian. Correct diagnosis and immediate and proper treatments are very important.

### PROTOZOAN DISEASES

<table>
<thead>
<tr>
<th>Disease</th>
<th>Age Commonly Affected</th>
<th>External Appearance</th>
<th>Internal Appearance</th>
<th>Prevention</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cecal Coccidiosis</td>
<td>One to 12 weeks, occasionally older</td>
<td>Chicks appear cold, droopy wings, feathers ruffled. In acute cases, free blood appears in droppings and feed consumption drops rapidly.</td>
<td>Caecal enlarged, containing blood stained material.</td>
<td>Clean, dry litter. Low-level feeding of preventive drugs.</td>
<td>Drugs as recommended by manufacturers.</td>
</tr>
<tr>
<td>Intestinal Coccidiosis</td>
<td>Eight weeks and over</td>
<td>Reduced feed consumption, birds lose weight, some lameness may occur, combs and wattles pale, bloody droppings may occur in acute cases.</td>
<td>Noticeable thickening of intestinal walls with minute white spots on inside. Small hemorrhages may occur in the intestine.</td>
<td>Range rotation. Dry litter in laying houses. Low-level feeding of a preventive drug.</td>
<td>As above.</td>
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# BACTERIAL DISEASE

<table>
<thead>
<tr>
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<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pullorum and Paratyphoid (turkeys and chickens)</td>
<td>One day to four weeks for acute state</td>
<td>Chicks appear cold, sleepy, chirping, pasting around the vent</td>
<td>Acute, none. Subacute small spots on liver, limbs, and/or heart.</td>
<td>Blood-test all breeding stock to identify pullorum carriers. Detection of paratyphoid carriers is difficult.</td>
<td>Sulpha drugs, Furazolidone or antibiotics according to the manufacturers' recommendations.</td>
</tr>
<tr>
<td>Fowl Typhoid</td>
<td>Usually young adult birds</td>
<td>Droopiness, listlessness, comb and wattles pale, green droppings.</td>
<td>Enlarged spleen, swollen liver, gall bladder distended.</td>
<td>Pullorum-testing identifies typhoid carriers. Obtain a replacement stock from tested flocks only.</td>
<td>Same as for Pullorum, also nihydrazone.</td>
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# VIRUS DISEASES

<table>
<thead>
<tr>
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<th>Prevention</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infectious Laryngotracheitis</td>
<td>Two months and over</td>
<td>Watery eyes followed by violent fits of coughing, gurgling sounds during breathing. Birds raise and extend neck when breathing.</td>
<td>Blood stained mucous adhering to the walls of the windpipe.</td>
<td>Vaccinate all replacement stock at 8-12 weeks of age.</td>
<td>None. Eradication of flock</td>
</tr>
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THE NEXT PHASE

Now that your chicks have lost their fluff and grown to maturity, they will begin to give you a return on your investment. They can do this in one of three ways:

- By being used for meat
- Being used for egg production
- Being used to start a new generation of pedigree show birds.

MEAT

Non-producing hens or any bird not required for propagating your flock or for egg production should be removed from the flock. These birds can be slaughtered and used for home consumption.

SLAUGHTER

The equipment needed for slaughter are a sharp knife, funnel, rope, propane torch and a pail of scalding water. The birds should be hung upside down in the funnel. To get a good bleed-out, cut the jugular vein in the neck and let bleed for a few minutes or until bleeding stops. The bird then should be removed from the funnel and immersed in the pail of scalding water 60-70°C (140-150°F). When the feathers become easy to remove, hold the bird by the feet and pluck out the feathers. When all the feathers are removed, use a propane torch to singe off hairs left on the bird.

The next step is to eviscerate the bird. Cut along the abdomen and around the vent enough so your hand can be inserted into the bird’s body cavity to remove the insides. When all insides are removed, insuring all the lungs and kidneys are gone, remove the crop by cutting along the skin of the neck and plying the crop away from the tissues. The remaining trachea should be removed with the head.

The feet of the bird should be removed and the legs tied together or enclosed in a flap of abdominal skin. The gizzard, heart and liver can be saved for eating. The gizzard is prepared by cutting along the middle, turning the inside out and removing the inner lining of the gizzard. The neck can also be removed. After washing out the inside and outside of the bird, the neck, gizzard, heart and liver may be placed in a small bag and placed inside the bird until the time the bird is ready for use. The bird should be cooled as quickly as possible and can be frozen until ready to cook. For long term storage, put the carcass in a plastic bag with excess air removed.

EGGS

A good flock of ten laying hens will produce three to four dozen eggs per week. This will supply the needs of most families. While supplying eggs for eating, your birds can supply eggs for hatching. These eggs should be from parents selected for show bird conformation, productivity, vigor, size, health and freedom from any physical abnormalities and must meet breed standards without any disqualifying traits present.