

Grower Guidelines for Poultry and Fowl Processing

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Grower Guidelines for Poultry and Fowl Processing

In this document we discuss general guidelines for working with small scale poultry processing plants. We have designed the document for small growers who will be bringing small lots to a local processing plant. Our focus is limited to preparation for and transport to the processing facility, activities at the processing center, and post-processing care. While this document is relevant to poultry and fowl processing anywhere, some portions may be specific to North Carolina.

1. Scheduling Processing

Careful scheduling is important to both growers and processors. The grower must consider the size of the animals and customer demand. Careful scheduling and adherence to that schedule is required for effective management of workloads and procedures at the processing facility. Similarly, it is important that processing facilities notify growers of any upcoming closures because many growers have customers that expect regular deliveries.

1.1. *Assessing live weight of bird*

In order to schedule the processing of your birds, it is necessary to estimate the approximate processing date based on your target live weight. Any reliable scale can provide a live weight of a bird or fowl provided that the animal has minimal movement when weighing. A small cage or crate can be used. Be sure to tare or zero out the scale or subtract the weight of the cage or crate only from the weight of the crate and bird to get net weight of the bird.

Dressed weights are about 75% of live weight. Most chicken is processed at a 4.5 pounds live weight, and this varies according to the meat product desired. The following dressed weights are what can generally be expected:

- Cornish Game Hen 1.5 pounds
- Fryer, broiler 3 to 4 pounds
- Roaster 5 to 6 pounds
- Stewing hen 6+ pounds

For example:

Crate + bird weight	6.7 pounds
Crate weight	2.3 pounds
Net weight of bird	4.4 pounds
Estimated dressed weight	$4.4 \times 0.75 = 3.3$ pounds

Both the breed of bird and the method of chilling affect the dressed weight. For example, water chilled Cornish X's may be 75%; whereas, air-chilled Cornish X's may be 72%. An air chilled heritage bird or other slow growing bird may be 68-70%. Exact determination of carcass weight ratios can only be determined by experience, and growers who have clients with very specific weight requirements should keep this in mind.

1.2. Time to market weight

Use the general figures below of the birds' age to estimate your time of processing. Remember that there is some variability in grow out time periods based on how the birds are raised. It is likely that you will have a heavier bird at the high end of the ranges provided.

- Cornish Cross 6 to 10 weeks old
- Heritage (Barred Plymouth Rock) 16 to 18 weeks old
- Slow Cornish 16 to 18 weeks old
- Turkeys (Broad breasted) 14 to 20 weeks old
- Turkeys (Heritage) 24 to 28 weeks old
- Ducks (Aylesbury & Rouen) 18 to 28 weeks old
- Geese (Toulouse & Embden) 32 to 36 weeks old

1.3. Lot size; Number of birds to process

Your marketing plan will determine how many birds you want to raise and process at any given time. Raising large batches of birds for wholesale marketing requires either an indoor production area or sufficient pastured poultry shelters (including waterers and feeders). Smaller batches of birds are suitable for direct sales to customers at farmers markets, through Community Supported Agriculture subscriptions (CSAs) or other venues. Small scale producers may have one or two batches growing at any given time. It is recommended that birds be grouped by age to minimize losses.

Male and female birds often grow at different rates with the males tending to grow faster. Given that unsexed chicks (straight run) are often the most economical to purchase, growers can consider harvesting the male birds earlier than the female birds.

Some processors charge an additional setup fee for batches of less than 100 birds. Consider processing more than 100 birds at a time to avoid these additional charges. You will likely have some losses during grow out, so consider starting with 110% of the number of chicks you want to process.

1.4. *Appointments with the processor*

Appointments are necessary and should be kept both by the processor and the producer. This is necessary to protect the health of the birds and avoid unnecessary costs to processor and grower. When processors offer a certified organic processing option to producers, organic birds are usually processed first. If the grower is late, he may lose the opportunity to have organic processing.

It is very important for growers to be on time and to bring the number of birds that they said they were going to bring. This is because people will be hired to work on the particular lot of birds and must be paid for the waiting time. If for some unexpected reason you will be bringing fewer birds than originally planned, try to let the processor know at least 5 days before your scheduled processing appointment.

During interviews with processors when preparing this document, we were told that the most challenging problem was growers who did not come on time. If the first grower is late, the entire day is adversely affected. As noted above, this is especially important for certified organic birds that are often processed first. Processors try to work with growers who have unexpected problems; however, because this is such a serious issue with small plants, they may charge an additional fee if a grower is late.⁸

1.5. *Notification of Growers of Processing Plant Closings*

Processors should notify growers at least 16 or more weeks in advance of any dates that the plant will not operate. A grower may have weekly customers demanding fresh product, and, therefore, must plan accordingly. Many customers expect to receive dressed products within a fairly small size range, and unexpected closings can result in birds that are too big for their market. At least 16 weeks notice of closings by a slaughter facility will allow growers to schedule hatching, and grow-out. Processors should consider providing a 6 month calendar of operating dates for use by growers.

1.6. *Understand options for processing and associated fees*

It is important to work with the processor to understand the options for processing and the associated fees. The processor may offer different fees based upon weekly volume or annual volume. Also, pricing is likely to vary by packing options,

for example, differences due to merely slaughtering and packing in bulk in totes or in wax box w/liner versus vacuum packing of each individual whole bird.

1.6.1. Cutting options

Examples of options that may be available at your processing facility are:

- Whole birds
- California Cut: 2 legs, 2 thighs, 2 wings, and a split breast
- 2 legs with thighs, and breast or 2 split breasts
- Separate packaging of legs and thighs, and breasts
- French breast (breast with a portion of the wing)
- Skinless
- Boneless
- Recovery of the
 - Liver
 - Heart
 - Feet
 - Gizzard

Processors may charge additional fees for recovery of organs and feet, for special cuts, skinless cuts, and de-boning.

1.6.2. Options for packaging material

Discuss the standard packaging that is available from the processor and options. In general, several options may be available including:

- Bulk packing in boxes with ice
- Loose plastic bags,
- Vacuum packs, or
- Shrink wrapping

Vacuum packing is the most expensive, but it offers the best seal for longer shelf life. Plants may offer “shrink wrap” which is achieved by dipping bagged birds in hot water to cause the bag to shrink. Dry tray packs may also be used by small processors; however, this is more common for large processors and is not suitable for freezing birds.

Processors may charge additional fees for special packaging requests, such as, 3 ml or 4 ml plastic, trays, or bulk packing. In general, if receiving your poultry in

boxes you should expect to be required to use the boxes provided by the processing plant.

1.7. *Label requirements and options*

Revisit your marketing plan when considering label options for your products. If your birds will be cutup or repackaged, labeling may not be a concern for you. However, if you direct market your birds to customers, consider that the label on your package is an important component to your product's appeal and success.

Labels on all meat products are regulated by the US Department of Agriculture and must be approved before use on any product. Most plants will have standard labels. Both plant and USDA inspector must approve label changes. It may take months to get custom labels approved by USDA. Anything on the label must be in language allowed by USDA and there are penalties for misstatements on a label.³ Therefore you should discuss label options with the processor at least 2 months before your target date. Determine the basic options available to you for labeling, and then provide a draft label to the processor so that the processor can get it approved by USDA.

If selling direct to the consumer, consider the option of providing your price per pound of cut to the processor so that your packages can be priced and ready for sale. This will save you time calculating prices at a farmers market or roadside stand. Remember, it is illegal to tamper with labels once they have been affixed to a meat package. You will need to obtain handlers license to allow you to transport meat products once they have been packaged by your USDA inspected processing facility.

There are certain phrases and words that have already been approved by USDA for use on poultry and fowl products. However, the label still needs to be approved for use before being affixed to any package. Approved terms include:

- No antibiotics
- All vegetarian feed
- Certified Organic
- Pastured

2. Preparation and Transport to the Processor

In this section we discuss the actual processing activities.

2.1. Crating equipment

Plan ahead for transporting your birds to the processor. If birds are not crated properly, they may die during transport or damage may occur that becomes evident during processing. Damaged or bruised poultry can reduce marketability and profit.

Crates can be wood or plastic; they may be purchased or fabricated on the farm.¹ Avoid wire crates because birds are easily injured in wire crates. Use cages that allow for air circulation during transport and that provide protection from weather and wind.³ Be careful during unloading and hanging to minimize carcass bruising, broken legs, broken wings, and red wing tips.² Clean empty crates or coops before reloading to minimize cross contamination among lots of broilers.

Murray McMurray sells crates that hold 6 to 8 turkeys and crates that hold 12 to 14 chickens; FarmTek also has a poultry transportation coop that holds 14 or so birds. They are made of plastic, and some types fully collapse for storage. The size of the bird and the weather on the day of transport can affect the number of birds you can put in a crate. If it is hot, put fewer birds in the crate.

Some processors will not accept birds that are not in crates. Others will accept “loose birds”. In some, the grower must unload the birds into the holding area.⁸ Below are some pictures of crates that were downloaded from online vendor ads.



2.2. Biosecurity

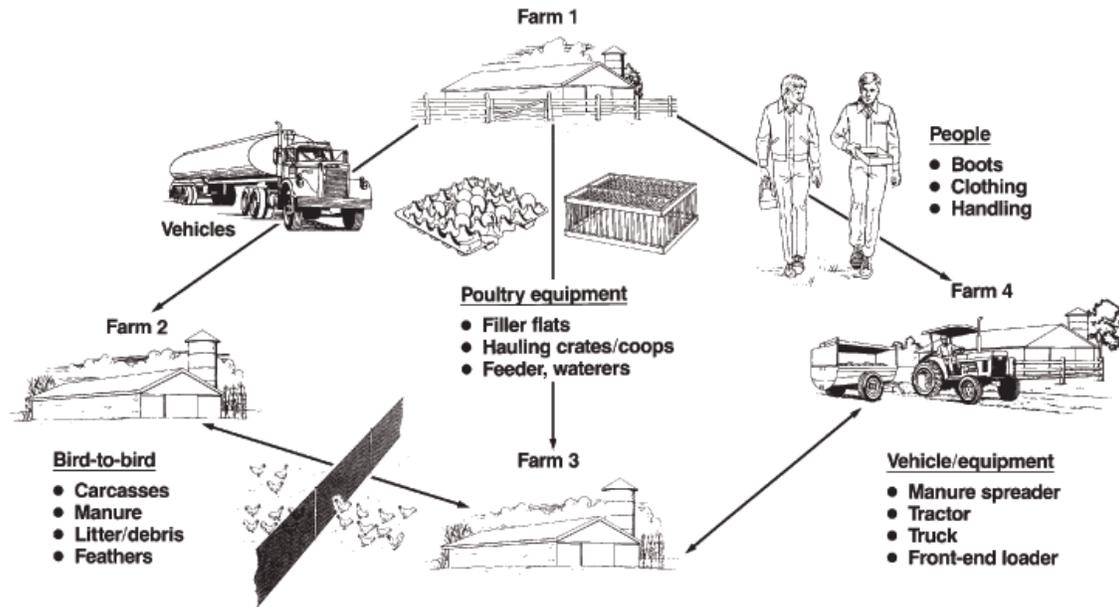
Each processor has a unique relationship to the inspector assigned to the processing facility as well as other USDA / State regulatory personnel. Many aspects of how the processing plant is operating involve considerable oversight for food safety, including random swab tests for harmful microorganisms.

To help your processor maintain the best possible degree of cleanliness in the processing facility, it is important that all producers raise birds in clean buildings or pens. Birds with dirty breasts and keels may be refused at processors or delayed until last batch to avoid cross contamination or other birds to be processed the same day.

Biosecurity involves much more than just your trip to and from the processor. It includes any trip to and from your farm, especially if you have clothes and vehicles that are in contact with your flock. No matter how you get your feed it involves a trip to and from the farm by you or someone else.

The graphic on the next page from the USDA illustrates how disease can spread from farm to farm. It is important to be cognizant of these risks and to strive to minimize them.

How Poultry Disease Spreads




 United States Department of Agriculture
 Animal and Plant Health Inspection Service

Disease Alert Number
 APHIS 91-55-66
 Issued June 2002

The US Department of Agriculture is an equal
 opportunity provider and employer.

From <http://www.aphis.usda.gov/lpa/pubs/hpds.gif>

Consider a spare pair of inexpensive rubber boots, and wear them only on your own premises, to avoid tracking in soil, manure, and debris that may cause disease. A long-handled brush can be used to scrape off manure, mud or debris from tires, equipment or boots, readying them for disinfection.

A solution of three parts bleach to two parts water can be used liberally to clean rubber boots and equipment brought onto your farm. If visitors do not want their vehicle tires sprayed with disinfectant, ask them to park outside your gate. Other disinfectants that work against AI (avian influenza) virus and should be mixed according to package labels include: detergents, hypochlorites, alkalis, phenols, Virkon S, and gluteraldehyde. Most disinfectants are inactivated by dirt and feces, so clean surfaces with soap and water and rinse well before applying disinfectant.

Always insist that visitors or customers disinfect their footwear -- or better yet, provide guests with disposable shoe covers, or footwear worn only on your place.

2.3. Transport to Processor

To ensure a quality poultry meat product, care must be taken during transport to the processor. Consider the following aspects of transport to ensure timely and humane transport of your birds to the processing facility.

2.3.1. Feed & Water Withdrawal

Ask your processor for his preference regarding feed withdrawal. Be certain to state what type of bird you plan to bring for processing, as there may be a difference regarding feed withdrawal. It is best for broilers to arrive at the plant and be scheduled for processing 8 to 12 hours after their last feeding. This decreases the amount of material that could potentially contaminate the carcass during processing by allowing adequate time for the bird's gastrointestinal tract to become empty.²

Feed withdrawal has been used for 40 years in the poultry industry. **Feed withdrawal time** is the sum of the time in the house or on the farm without feed plus the live haul time plus the time in plant holding area. Be sure to include all of these time intervals in your planning.

The length of the feed withdrawal affects⁵:

- Carcass contamination and yield
- The need for reprocessing and live weight losses
- Efficiency of the plant processing line due to downtime to remove contaminated carcasses

- Grower payments because of weight loss before the bird is killed
- Product safety and product quality by affecting the likelihood of pathogenic and spoilage bacteria on the finished product.

After 13 to 14 hours without feed, birds begin to lose the mucosal lining of their intestines and will have lower carcass yields at slaughter. When the intestinal lining is lost, fecal material in the bottom of the coops will have a reddish-orange appearance and the resulting intestine will be much weaker and more easily broken during evisceration.²

Withdrawal times should be tailored to the unique conditions related to each producer/processor complex. Live production management factors such as light, temperature and stress can affect the rate of feed passage after food is withdrawn. It is best to minimize the exposure to any condition that slows the passage of feed or causes the birds to gorge prior to feed withdrawal. Under continuous lighting and access to water, 80 to 85 percent of the ingesta are evacuated during the first 6 hours. Exposure to darkness after broilers are cooped slows evacuation.⁵

Temperature also affects the effectiveness of feed withdrawal. Longer withdrawal times are recommended during the summer months when temperatures can reach 90 + degrees. If birds are raised indoors, longer feed withdrawal may be necessary when indoor growing house temperature are less than 60 degrees.⁵

Short feed withdrawal times increase likelihood that the intestines are cut during vent opening or that the force of the evisceration will cause intestinal material to leak out onto the carcass. This is due to structural or positional differences encountered with full versus empty viscera. Long feed withdrawal times cause the intestinal wall to weaken and bile contamination of the carcass. The gall bladder becomes enlarged and may break during evisceration. After 4 hours of feed withdrawal, birds may begin to consume litter and fecal material. Consumption of fecal material should be avoided.⁵

Using optimal feed withdrawal times has many advantages, mainly, less bacteria on feet and feathers, less contamination of scald water, less fecal material in the bird's digestive tract, and reduced carcass contamination. Processing lines run faster and more efficiently because mitigating procedures required due to fecal contamination are avoided.⁵

USDA has a zero tolerance for fecal material on carcasses entering the cooler.⁵ Keep records, monitor flocks, avoid disturbances immediately after feed withdrawal; keep birds on litter with access to water before cooping—generally 4 hours after feed withdrawal. Keep birds cool in hot weather; do not let birds run out of food before the scheduled withdrawal time.⁵

Consider that there may be species differences. Turkeys should have access to fresh water prior to shipment to the processor.³

Some growers have found that in cold weather withdrawal needed to be more than 12 hours for birds that were crated overnight and transported a considerable distance to the processor. They found that cold weather coupled with being in the crates made the birds much less active and resulted in a much longer time for the birds to clear intestinal tract.

2.3.2. How to crate birds

Catch and crate birds in a manner that minimizes stress. Always place birds in crates with their head upward and remove birds from crates head first. Send only fit birds for processing and remember that careful handling can reduce losses. Track trends in injury during processing to determine how to make changes in procedures. Do not tightly pack birds. Savings in number of crates purchased will be offset by losses due to injury.³

Most bruising occurs within 12 to 24 hours of processing. Good live haul procedures can reduce bruising and the number of birds that arrive dead at the plant. Broilers that are transported long distances have fewer bruises due to confinement and fatigue. However, live shrink is increased as is digestive track clearance.²



The proper way to hold a chicken: With its breast resting in your palm, slide one leg between thumb and index finger, and the other leg between index finger and middle finger. Tilt bird with its front slightly downward. Picture from the American Livestock Breeds Conservancy: <http://albc-usa.org>.

2.3.3. Birds per crate

The following general guidelines concerning the number of birds per crates are found in the literature.

General guidelines for chickens and smaller poultry: ¹

- Hot weather (> 85 °F): Eight 4 to 5 pound birds per crate
- Cool weather (<85 °F): Ten 4 to 5 pound birds per crate

Place similarly sized birds in a crate; mixing bird sizes can lead to damaged birds. For turkeys the general guidelines call for 6 hens per crate and only 3 toms due to size differences. In general one should not mix male and female birds or large and small birds. Males and females of young broilers can be mixed since they are not sexually mature and are generally of similar sizes.

Place birds in crates such that all the birds in a crate will be processed the same way. Also, it is helpful to both the processor and the grower if the grower groups birds into lots, according to what they want done to the birds. Whole birds could be Lot A, cut-up birds, lot B, and so on.

2.4. *Transporting Birds to Processor*

Change your clothes after having loaded your birds, but before you leave to drive to the processor. When you arrive home, take your travel clothes off and wash them. This biosecurity best management practice avoids the possibility of disease transmission.

During transport protect your birds from extreme heat and cold.³ Cover crates with tarp if it is raining, but if temperatures are high consider other options. Be sure you have an appropriate truck and / or trailer; 200 birds in 25 crates weigh about 1250 lbs.¹ After you have left your farm, check your loaded birds after traveling 5 or 10 minutes to ensure tie-downs are secure.

If for some reason you will not be able to make your scheduled appointment with the processor, call them and alert them to the difficulty. As noted above, one of the most challenging problems that processors face is growers who do not arrive on time and, therefore, adversely affect the day's schedule. Processors try to work with growers who have unexpected problems; however, because this is such a serious issue with small plants, you can expect to pay additional for late arrival.⁸

2.4.1. *Delaying processing due to dirty birds*

Occasionally very heavy rains or a water leak may create a very dirty, muddy pen so that there is excess dirt or fecal matter on the birds. Growers should notify the processor of the problem and discuss the option of delaying the processing. Another option is to process the lot at the end of the day in order to not contaminate the water in the scald.

3. Processing

Be professional and respect the facilities and operation of the plant. Wear clean clothes, help if it is allowed and do not use plant facilities without permission and compensation of the plant. Remember that the plant is working on a small margin just as the grower is.

In some plants, producers are welcome to stay at the plant during processing; however, it is best to avoid coming in and out of the offices because staff have to come and check each time to see if some new person has arrived.⁹ In addition, any open doors allow flies and other insects to enter, which causes increased concerns for the processor and inspector. One processor had to restrict use of their water and facilities by growers who were cleaning their trucks and cages while they were waiting at the plant.⁸

3.1. *What to expect at the processing facility*

Typical steps at the processing facility include:

- Signing in at main entrance
- Filling out or submitting any necessary paperwork¹
- Determining when the birds may be ready for pick up
- Providing mobile phone contact information
- Completing processing request forms
- Specifying of bird type—heritage, Cornish cross, etc.
- Indicating cuts desired on specific crates of birds
- Special requests (Halal, kosher, organic)
- Confirming packing options

After processing, birds are chilled for storage. You may be able to specify whether or not you will pick up a fresh or frozen product. In all cases, birds will have to remain at the processing plant until they are sufficiently chilled.

Fresh poultry must never have been stored below 26°F. Poultry kept between 26 and 0°F must be labeled “hard-chilled or “previously hard chilled.” Poultry kept below 0°F must be labeled frozen or previously frozen.³ If there is chlorine in the chill water, bacteria on the carcass may be removed during the chilling operation.²

¹ Consider filling out required forms prior to arrival at the processing plant.

3.2. *Ensure birds are cared for at the plant*

Keep birds comfortable at the processing plant. Shade must be available and a fan oriented to circulate fresh air through the crates as a moderate velocity. Birds experience 1 percent weight loss for every 2 hours of transport.¹

3.3. *Uncrating birds*

Do not unload birds until you are authorized to do by the processor. Unload carefully to prevent injury and stress. Wing flapping can cause injury to the muscle and broken bones.¹ Turkey crates can weigh up to 100 pounds. It is best to stay at plant and help with the unloading to prevent injury to birds and people. Unload head first.³ Participating in the unloading of the birds allows you to determine the number of birds that died in transport. In addition, good records on the conditions associated with this die-off will help you prevent problems in the future.

3.4. *Opportunity for producer to view / witness processing*

Some plants allow producers to assist in hanging birds, which allows for extra care to be provided to birds during uncrating thereby reducing blemishes and bruising.^{8,9}

The processing entails the following steps: stunning, bleeding, scalding and picking, removal of head, oil glands and feet; evisceration, washing, and chilling. In particular:

- Birds will be stunned at the plant either with electricity or anesthetized with carbon dioxide or argon gas. Improper stunning can affect meat quality.¹
- Position of the birds' head determines bleed time.
- Birds should be dead before they are scalded. If they are alive when entering the scald water, trachea, esophagus, lungs, crop, gizzard and air sacs may become contaminated with scald water.²
- Anything that interferes with the formation of rigor mortis or the softening process that follows will affect meat tenderness. Struggling, environmental stress, high scalding temperatures, and long scalding times can cause poultry meat to be tough.⁴ In addition, high scalding temperatures can burn skin or cause it to split, thus damaging the birds.
- Tenderness of portioned or boneless cuts is influenced by the time post-mortem of the de-boning. Meat should be aged between 6 to 24 hours before de-boning. This is expensive for the processor. Post-slaughter electrical stimulation can hasten rigor development and aging time.⁴
- USDA requires birds to reach an internal temperature of 40 degrees F within 4 hours for a 4 lb broiler, 6 hours for a 4 to 8 lb bird, and 8 hours for a bird greater than 8 lbs. Methods are ice water tanks and water chilling.

Birds may absorb water and broilers typically contain 6% water. Small processors usually have less water uptake. Air-Chilling is also used with air being blown into the carcasses. Evaporative chilling is a type of air chilling.¹ USDA regulations require air chilled birds to reach 40 degrees F in 16 hours or less.¹²

- Chickens should not be de-boned for at least 4 hours because it will cause tough meat due to the effects of rigor mortis.¹
- Chicken tenderness is related to aging. Poultry meat needs to age for 4 hours before it is eaten or frozen.¹
- If the body cavity of the bird appears convex, then feed was not withdrawn for a sufficient time before processing and the bird's intestines are full of fecal material. Full intestines may break during evisceration and leak on the carcass. Withholding feed for more than 14 hours is also a problem because the intestinal lining is lost and may break during processing. Carcass, gizzard, and liver contamination with bile are related to extend feed withdrawal time. This causes the plant to have to rewash and reprocess the birds which is expensive.²

3.5. Condemnation of birds and bird parts

The USDA inspector will examine the animals and may condemn whole birds or parts of birds. You should assess the birds and bird parts condemned in processing by USDA inspector and note this on processing specification form. Also, note bird quality issues related to processing. Less than whole birds may be returned because the plant inspector ordered certain parts that were bruised or otherwise damaged to be removed.³

Condemnation rates can be related to the processing procedures. For example, pickers should be near the scald water. If birds cool there will be picking problems. Improper picking can be a source of bruising, wing breaking, and broken hocks.² Stunning should be done at 12 to 150 mA per bird for 2 to 11 seconds. Too high stunning voltage causes wing hemorrhages, red skin condition, poor feather removal, broken bones, and bloody splashes in the meat.²

The grower should provide the processor with directions for handling downgraded birds (broken wings, legs, split skin, etc.) prior to slaughter. Otherwise, the bird may be packaged and labeled as whole bird with missing parts, which may make that bird harder to market. If allowed, it may be advantageous to suit up and observe the killing, scalding, and picking to ensure the quality of the processing being done. The quality of the product you receive from a processor can vary depending on conditions within the plant. It is up to the grower to insist on a consistent product. No matter how nice a bird you produce, your reputation will be associated with the quality of the finished bird and the packaging.

3.6. *Pick-Up / storage at processing facility*

Be sure to arrange pickup time when unloading birds at plant for processing. Confirm pick up time by calling the processor to arrange a pick up appointment. Processors may provide frozen storage of products but be sure to arrange this in advance.

4. Post-Processing

You will need to obtain a meat handlers license to transport and sell processed poultry. In North Carolina this is obtained from the NC Department of Agriculture and Consumer Services. Information can be found at their web site at <http://www.ncagr.com/meatpoultry/meathandlers.htm>. Inspection of your storage site and transporting coolers is required. The requirements include:

- No changes to labels after they are affixed at the processing plant and bear the labels on the outermost container
- Structure of the storage facilities
- Sanitation of facilities
- Rodent and pest control
- Transport vehicles and containers
- Product handling and storage including temperature control
- Handling of damaged product

Construct the storage facilities and acquire the required equipment before you commence growing the broilers.

4.1. *Post-processing transport*

Bring a sufficient quantity of your own coolers to pickup processed birds. Some plants will provide shipping boxes that you can use instead. Consider smaller coolers that may be easier to lift and move when full. Some producers like the 48 qt size cooler without the cup holders for fresh or frozen bird transport. It is illegal to bring your own ice into a USDA inspected plant. Either use the plant's ice or add your own when you have the processed birds in your vehicle. You cannot take previously used boxes back into plant unless they are plastic totes that can be disinfected by the plant. Check with processor regarding this. However, you can pick up birds at the plant and then pack in your own previously used boxes, such as wax boxes.

4.2. Post-Processing storage

It is extremely important to ensure reliable temperature control. Birds must be maintained below 40 degrees F. This yields a 10 day shelf life. Frozen birds can be stored at zero for up to 6 months.³ Meat does not freeze until it gets below 28 degrees F because of the salt content in the meat.

Freezing does not kill all the microbes; some will survive and grow after thawing. If meat will be frozen for a long time, it is better to vacuum pack it. This prevents water evaporation and ice formation inside. Removing the oxygen also helps reduce oxidation and rancidity. In young chickens, bones may darken when the bird is frozen.¹ Consider setting an alarm on the temperature mechanism to alert you of above temperatures that are above the minimums.

Remember that each time you move packages, especially frozen packages, the seal may become compromised or the plastic package pierced. This can cause ice crystals to form inside the plastic and does not look appealing to the prospective customer. As a result, these packages often need to be discounted and are considered a financial loss to the producer.

Additional information about raising poultry can be obtained from your local Cooperative Extension agent and via numerous on-line and hard copy publications.

**A Pastured Poultry Resource List is available on
North Carolina Cooperative Extension's website at
<http://chatham.ces.ncsu.edu/growingsmallfarms/poultrylist.html>.**

**Selling Eggs, Meat, and Poultry in North Carolina:
What Farmers Need to Know
is available on
North Carolina Cooperative Extension's website at
<http://chatham.ces.ncsu.edu/growingsmallfarms/meatandeggs.html>**

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Appendix A. Table of Problems, Sources, and Solutions

from:

Reference Guide for Solving Poultry Processing Problems

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Bulletin 1156/May, 1997

The following material is available from the above reference. It is included here for the convenience of the reader. The reader may wish to consult the document for additional information.

Table 1. Problems and Solutions Observed During Uploading Broilers through the Picking Room.		
Observations	Causes	Corrective Action
Wing Damage	Wings caught on coop door. Hangers too rough. Toe guard out of line. Pickers not properly adjusted. Picker fingers missing. Field causes.	Make sure doors on coop at proper angle for dumping. Hangers shouldn't pick up birds by the wings. Adjust toe guard. Adjust pickers Replace missing or worn fingers daily. Checks for field bruises/broken bones.
Carcass Bruising	Stunning voltage too high. Picker not properly adjusted. Field causes.	Check voltage. Adjust pickers daily. Check flock placement density in grow-out house.
Poor Bleed-out, "Red Birds," "Red wing tips"	Improper setting for neck cutting. Bleed time too short. Back-up personnel in killing area. Birds not properly stunned. Overscalding.	Do not sever the spinal cord, trachea or esophagus during neck cutting. Adjust killing machine & sharpen knife. Check with the back-up personnel. Make sure the bleed time is at least 55 sec. Allow birds time to calm down before stunning. Check the stunner. Check scald temperature (124-138 degrees F).
Dead birds on line (cadavers)	Hangers too rough. Neck cutting malfunctioned. Live birds entered scald.	Check hanging, killing areas.
Shattered bones, disintegrated hearts & livers, pooled blood in the body cavity, blood splashes or blood spots in meat	Stunning voltage too high.	Adjust stunner and stunning conditions.
Miscut or broken hocks	Improper setting on hock cutters. Worn equipment. Birds not hung correctly. Bird size variation. Weak bones.	Check hock cutters with each bird flock; adjust properly. Check foot unloader. Check with grow-out manager and nutritionist if you suspect weak bones.
Breast Blisters	Field causes related to litter condition.	Alert grow-out manager of increase in breast blisters.
Underpicking	Scald temperatures too low or not uniform. Pickers misaligned.	Check scald temperature and adjust, if necessary. Check picker.

Table 2. Problems and Solutions Observed During Poultry Evisceration.

Observations	Causes	Corrective Action
Carcass Contamination	Broilers off feed too short or too long before processing. Intestines are cut or torn.	Check with grow-out manager and adjust feed withdrawal time to 8-12 hr. Adjust vent opener.
Oily Birds	Nutritional imbalance. High scald temperature. Pickers too close together.	Check with nutritionist. Check & adjust scald temperature, if necessary. Adjust pickers, if necessary. May be related to seasonal weather.
Abnormal condition of intestines	Weak intestines. Watery fecal material. Possible disease condition.	Check length of feed withdrawal. Check for possible disease conditions in the field.
Downgrades too high	Wing bruises, back bruises, leg bruises, poor bleed-out, contamination, breast blisters, etc.	See <u>Table 1</u> .
Carcasses contaminated with bile	Feed withdrawal time too long. Draw spoon needs adjusting.	Check to see if gall bladders on eviscerated broilers are enlarged. Large gall bladders indicate feed withdrawal is too long. Check evisceration equipment.

Table 3. Problems and Solutions Observed During Chilling and Packaging.

Observations	Causes	Corrective Action
Carcass/parts moisture too low or too high	Improper time in chiller. Improper temperature sequence of chillers. Cuts, tears, excessive loose skin.	Notify chiller operator. Check vent opening and pickers.
Bird temperature too high or too low	Improper temperature in chiller.	Adjust temperature of chiller. Discuss problem with chiller operator.
Stated weight is not the same as actual weight.	Scale is off. Improper moisture pick-up.	Check tare weight. Check scales daily.
Excessive short weights.	Moisture too high. Product is warming during transportation.	Check moisture pick-up records. Check packages for excessive purge. Check truck loading & unloading procedures.
Product returns for off-odors	Product is warming during storage or transportation. Contact with contaminated surfaces or other contaminated products.	Check product storage temperature, out-going product temperature & chiller temperature. Check chlorine levels in chiller. Have QC check equipment sanitation procedures, and check for spoilage organisms on the product.