Developing a Beginning Farmer Training Program for Western New York's Minority and Low Resource Farmers

ONE20-369

Lesson Plans for 8-Workshop Series

This material is based upon work supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, through the Northeast Sustainable Agriculture Research and Education program under subaward number ONE20-369

Cornell University Cooperative Extension

PROVIDENCE FARM COLLECTIVE

NORTHEAST SARE Sustainable Agriculture Research & Education

CCE & PFC Workshop Series
SARE Partnership Grant

Workshop Topics:

Broiler Mini-Series:

1. Brooding/Rearing/Making Structures
2. Health and Nutrition
3. Labeling/Food Safety and Marketing/Business
4. Packaging and Processing

Mushroom Workshop - Oyster Production on Straw

Beekeeping Field Trip - Tour at Masterson's

Goat Field Trip - Tour of Emma Smalley's Goat Meat Operation

Pig Field Trip - Tour of Nicholas Kron Farrow-to-finish operation

Workshop Lesson Plan

Title: Chickens #1: Brooding/Rearing/Making Structures

Presenter (profile):

Amy Barkley, Cornell Cooperative Extension Livestock and Beginning Farm Specialist

Amy grew up on a small farm in Northeastern Pennsylvania where her family raised poultry, hogs, beef cattle, a market garden, and an orchard. She has over 10 years of experience in the poultry industry, including research, broiler (meat bird) production, egg production, food safety, and quality assurance. Amy and her husband live in East Concord, NY, where they have a small diversified farm raising poultry, vegetables, fruits, and honeybees.

Date and Time:

May 14th, 2021, from 5pm - 7pm at Providence Farm Collective

Synopsis (1-2 sentences about the workshop):

This workshop will teach students how to build a chick brooder from scratch as well as how to make a currently existing building predator proof and ready for chicks. Students will also learn how to build a mobile chicken house, called a “chicken tractor”. Information on brooding and rearing techniques will be shared.

Learning Objectives:

- Understand the difference between brooding and rearing.
- Learn how to care for young chicks.
- Gain skills to determine when chicks are ready to go on pasture.
- Receive instruction on building a brooder for 25 chicks and build brooder
- Tour the new PFC brooding building and learn about how to improve the building for poultry.
- Receive building plans for building a mobile chicken house (“chicken tractor”) for 25 chickens and use the building plans to build the structure.

Materials*:

- Writing instruments
- Building plans for brooder and chicken tractor
- Powerpoint for Brooding and Rearing Chickens
- Guides for:

    - Brooding/rearing temperatures, chick comfort, feathering
    - Pasture movement chart
    - How to make a building safe for poultry
- Tools: drill(s) with phillips head bit, hammers, staple gun and staples, circular saw, table top saw (if available), hand saws, measuring tapes, tin snips, wire cutters,
- Building Supplies (see “PFC Broiler Project - Materials Needs List 12.7.20”)

Procedure**:

10 minutes - Welcome and share plan for the mini-series

20 minutes - PowerPoint Presentation: During this presentation, farmers will learn about the basic lifecycle of a chicken and the expected growth rates of different types of meat chickens. Care and management of young chicks will be discussed as well as indicators of when the chicks are large/old enough to go into their grow-out coops.

20 minutes - walk over to current turkey coop and discuss what makes it a good brooding building. Ask the farmers to discuss what needs to be fixed up and why.

15 minutes - Review building plans

45 minutes - Break out into two groups - one will get started with the brooder, and one will get started with the chicken tractor. It is not expected for farmers to finish building these structures during the class time unless they have time/want to. Teams can finish up at either a TA visit tbd or can finish up on their own if they’re comfortable.

10 minutes - Share experience building the housing and discuss how housing can be made at home. Discuss how chickens would be raised in their home countries. Collect copies of poultry budget spreadsheet for use in week 2.

*Should include any handouts needed for the workshop, associated record keeping templates, additional handouts/resources to further learning.

**Lessons should end with enough time to facilitate peer-to-peer learning and discussion.

Workshop Lesson Plan

Title: Chickens #2: Health and Nutrition

Presenter (profile):

Amy Barkley, Cornell Cooperative Extension Livestock and Beginning Farm Specialist

Amy grew up on a small farm in Northeastern Pennsylvania where her family raised poultry, hogs, beef cattle, a market garden, and an orchard. She has over 10 years of experience in the poultry industry, including research, broiler (meat bird) production, egg production, food safety, and quality assurance. Amy and her husband live in East Concord, NY, where they have a small diversified farm raising poultry, vegetables, fruits, and honeybees.

Date and Time:

June 5th, 2021 from 10am - 12pm at the Providence Farm Collective

Synopsis (1-2 sentences about the workshop):

This workshop is designed to help students develop an understanding of poultry nutrition, including typical feeds, alternative feeding options, and how to keep feeding records for profitability measures.

Learning Objectives:

- What feed components make up a chicken's diet?
- Determine what types of feed are best for a chicken's age and stage of life through reading feed tags.
- Learn what plants, fruits, vegetables, and table scraps are ok to feed chickens and how much should be fed.
- Learn how to maintain flock feeding records as part of a flock budget.
- How to use feed and mortality charts.
- Learn to differentiate between common poultry diseases and how to treat them.

Materials*:

- Writing instruments
- Health and Nutrition Handout
- Feed tags
- Examples of alternative feeds grown at PFC

- Poultry budget spreadsheet
- Poultry feed chart and mortality sheet

Procedure**:

10 minutes - Welcome, pass out poultry budget spreadsheet

25 minutes - A hand out will be used alongside a presentation where farmers will learn the basics of poultry nutrition including common feed ingredients; the importance of protein, energy, vitamins, and minerals; feed forms; the importance of water; how much feed and water a bird should be consuming by age; how feed consumption varies by type of broiler (slow, medium, fast growth) and the associated efficiencies.

10 minutes - Pass out feed tags and teach farmers to read them

10 minutes - Share applicable line items in poultry budget spreadsheet and update accordingly. Collect copies of the poultry budget spreadsheet for use in week 4.

15 minutes - Discuss feeding alternative feeds, including what plants and products produced at the collective are nutritious and safe to feed chickens. Have farmers share what would be fed to chickens in their home countries.

30 minutes - Instruction on common poultry diseases, including how to identify them, when they're likely to show up over grow-out, and how to treat them. Best management practices to help prevent illness will also be discussed.

20 minutes - Visit chicks and assess their health. Have farmers share updates on chicks and discuss if they are ready to go onto pasture or not.

*Should include any handouts needed for the workshop, associated record keeping templates, additional handouts/resources to further learning.

**Lessons should end with enough time to facilitate peer-to-peer learning and discussion.

Workshop Lesson Plan Template

Title: Chickens #3: Food Safety, Labeling, Marketing, and Business

Presenter (profile):

Amy Barkley, Cornell Cooperative Extension Livestock and Beginning Farm Specialist

Amy grew up on a small farm in Northeastern Pennsylvania where her family raised poultry, hogs, beef cattle, a market garden, and an orchard. She has over 10 years of experience in the poultry industry, including research, broiler (meat bird) production, egg production, food safety, and quality assurance. Amy and her husband live in East Concord, NY, where they have a small diversified farm raising poultry, vegetables, fruits, and honeybees.

Date and Time:

July 24th, 2021, from 10am - 11:30am at Providence Farm Collective

Synopsis (1-2 sentences about the workshop):

This workshop will explore food safety considerations for processed poultry, including cooling, refrigeration, and packaging. Students will learn how to design labels to sell their product and use poultry budget spreadsheets.

Learning Objectives:

- Learn food safe temperatures and how to properly chill and store carcasses prior to and following packaging.
- Design a hand-drawn butchers' label for a whole carcass processed under the 1,000 bird exemption.
- Learn the regulations needed to sell carcasses by weight vs by the piece.
- Review the poultry budget spreadsheets and go through an estimate of profitability from two example flocks (one medium-growth and one slow-growth).

Materials*:

- Writing and coloring instruments
- PowerPoint presentation and projector
- Labeling requirement hand-out
- Food safety hand-out
- Cut-up sheet handout
- Labels (with appropriate adhesive to stick to packaging)
- Pre-printed food safety stickers for labels
- Poultry budget spreadsheets

- Two example poultry budgets

Procedure**:

10 minutes - Introduction to lesson

25 minutes - Presentation to share food safety and labeling requirements for whole birds, giblets, and pieces.

15 minutes - Students design their own labels for whole birds and pieces of choice (breast, leg quarters, drums, thighs, wings, halves, or giblets)

15 minutes - Students discuss and share how meat is sold in their home countries. This discussion will lead to the two options of selling meat in the United States (by weight and price) as well as the pros and cons of each.

25 minutes - Presentation to review two example budgets and how to price chickens to make a profit. Compare these examples to project budget spreadsheets.

*Should include any handouts needed for the workshop, associated record keeping templates, additional handouts/resources to further learning.

**Lessons should end with enough time to facilitate peer-to-peer learning and discussion.

Workshop Lesson Plan Template

Title: Chickens #4: Processing and Packaging

Presenter (profile):

Amy Barkley, Cornell Cooperative Extension Livestock and Beginning Farm Specialist

Amy grew up on a small farm in Northeastern Pennsylvania where her family raised poultry, hogs, beef cattle, a market garden, and an orchard. She has over 10 years of experience in the poultry industry, including research, broiler (meat bird) production, egg production, food safety, and quality assurance. Amy and her husband live in East Concord, NY, where they have a small diversified farm raising poultry, vegetables, fruits, and honeybees.

Date and Time:

August 14th, 2021, from 7am - 10am at the Providence Farm Collective

(This workshop may not allow for all birds to be processed; Amy and Mo may have to stay behind to finish up. Any students who would like to stay are welcome to.)

Synopsis (1-2 sentences about the workshop):

Students will learn the techniques of poultry processing through a live demonstration, followed by an opportunity to process a bird themselves. Packaging whole birds and cleaning and sanitizing of equipment will also be demonstrated and practiced.

Learning Objectives:

- Students will learn how to safely process a chicken in a humane manner while achieving high meat quality
- How to evaluate chickens to ensure they are fit for human consumption
    - Learn what normal, healthy organs look like
- How to keep the chicken food-safe throughout the process
- How to pack a chicken for resale
- How to properly clean and disinfect processing equipment
- Proper disposal of offal in a compost pile

Materials*:

- See “Broiler Processing Day Supplies List”
- Processing Day Record Sheet
- Step-by-step processing handout and normal, healthy organs guide

Procedure**:

10 minutes - Introduction, skills assessment

20 minutes - Amy and Mo to demonstrate process from killing to chilling

1 hour and 30 minutes- Rotate through farmers who want to process until all birds are processed or until time has elapsed. Mo and Amy will stand in as TAs, answering any questions that arise.

10 minutes - cut-up demonstration

40 minutes - Discuss packaging options and package birds. Train students in proper cleaning and sanitation of equipment used. Show students how to dispose of offal in a compost pile.

10 - Discuss experience and have farmers share how this process compares to the one used in their home countries.

*Should include any handouts needed for the workshop, associated record keeping templates, additional handouts/resources to further learning.

**Lessons should end with enough time to facilitate peer-to-peer learning and discussion.

Workshop Lesson Plan Template

Title: Oyster Mushroom Production

Presenter (profile):

Amy Barkley, Cornell Cooperative Extension Livestock and Beginning Farm Specialist

Amy grew up on a small farm in Northeastern Pennsylvania where her family raised poultry, hogs, beef cattle, a market garden, and an orchard. She has over 10 years of experience in the poultry industry, including research, broiler (meat bird) production, egg production, food safety, and quality assurance. Amy and her husband live in East Concord, NY, where they have a small diversified farm raising poultry, vegetables, fruits, and honeybees.

Date and Time:

July 30th, 2021 from 4pm - 6pm at the Providence Farm Collective

Synopsis (1-2 sentences about the workshop):

This workshop will teach the basics of speciality mushroom production. Students will have the opportunity to learn methods of growing a popular specialty mushroom, oyster mushrooms, on bag cultures in a controlled environment via a hands-on demonstration.

Learning Objectives:

- Which mushroom strains are the best to cultivate using log and bag methods
- Learn cultural considerations (time, temperature, and humidity) for common strains of easy-to-grow specialty mushrooms
- Learn the life cycle of mushrooms and determine when oyster mushrooms are ready to harvest
- Identify two straw sanitization methods
- Hands-on oyster mushroom bag preparation

Materials*:

- Writing and coloring instruments
- Mushroom Handouts
- Screened draining table(s)
- 3 food safe barrels (55 gal) (2 for liming straw, 1 for chopping straw)
- Disposable gloves
- pH strips
- Hydrated Lime (Hy-Yield)
- Measuring cup and/or scale
- 5 small square bales of straw
- Weed whacker

- Water source
- Oyster grain spawn (Grey Dove (2- 5lb bags), PoHu (2-5lb bags), Summer White (1-5lb bags)
- Folding table to pack bags
- Very sharp knives or arrow heads (to cut slits in bag)
- Example of fruited bag with mushrooms of various stages and sporulated bag showing mycelium penetration into substrate after 3-5 weeks.

Procedure**:

15 minutes - Introduction and discussion of mushrooms, including varieties they have consumed here or in their home country, production practices back home, and common uses for mushrooms in their cultures.

30 minutes - Presentation of speciality mushroom types and cultivation methods, with special focus paid to bag-grown oyster mushrooms.

15 minutes - Evaluation of demonstration mushroom bags (brought in by Amy). Talk about mycelium development, fruiting, and when to harvest.

50 minutes - Teach students how to build their own fruiting bags, hands-on demonstration

10 minutes - Class conclusion: discussion of next steps and questions

*Should include any handouts needed for the workshop, associated record keeping templates, additional handouts/resources to further learning.

**Lessons should end with enough time to facilitate peer-to-peer learning and discussion.

Workshop Lesson Plan

Title: Beekeeping Tour at Masterson's Garden Center

Presenter (profile):

Masterson's is a family owned and operated garden center, specializing in water gardens & Koi, plants & garden solutions, beekeeping, and pond & lake management. They provide both products and classes to help make farm and home outdoor projects successful. Over the last 5 years, Mike Masterson and his daughter, Erin, have trained over 700 beekeepers.

Date and Time:

August 1st, 2021, 2pm - 3:15pm at Masterson's Garden Center 725 Olean Rd #9781, East Aurora, NY 14052

Synopsis (1-2 sentences about the workshop):

Students will have a tour of beekeeping at Masterson's Garden Center. There will be an opportunity to view an observation hive, tour a small-scale beekeeping set-up, be introduced to beekeeping equipment, and ask questions.

Learning Objectives:

- Learn the basics of starting a small-scale apiary, including start-up costs, equipment needs, time commitments, and annual care.
- Share the benefits of beekeeping and how bees can fit into a farming operation
- Introduce the economics of beekeeping
- Understand the social structure of a bee hive
- View an observation hive
- Ask questions to the expert!

Materials*:

- **Hand-outs on:**
  - Supplies needed to get started
  - Beekeeping Resources
  - Beekeeping Records Template
- Writing utensil
- **Question sheet for Amy and Mo to lead discussion:**
  - History of your operation
  - What do you need to get started raising bees?
  - Where can you purchase bees, and are there different kinds of bees?
  - Other considerations before you start raising bees?
    - Space, number of hives, how long until first harvest
  - What responsibilities come along with beekeeping / how much time does it take?
  - Costs of beekeeping and expected production/sales?
    - Do you recommend getting started with used equipment or new equipment?
    - How much should you expect to spend in both time and money on managing Varroa and other diseases? Are these common?
  - What are common issues experienced by small scale beekeeping businesses?

- Any financial numbers/examples, successes, and challenges you can share would be great!

Procedure**:

Students will arrive at Masterson's at 2pm. Amy and Mo will share a little bit about the group with the tour guides at the start of the visit and guide the tour and discussion with the questions above. Students will depart Masterson's at 3:30pm.

*Should include any handouts needed for the workshop, associated record keeping templates, additional handouts/resources to further learning.

**Lessons should end with enough time to facilitate peer-to-peer learning and discussion.

Workshop Lesson Plan

Title: Goat Farm Tour at Emma Smalley's Farm

Presenter (profile):

Emma tends a herd of 50 meat goats, which she sells to restaurants, the international community, meat markets, and corner groceries in urban areas.

https://nyfarmlandfinder.org/find-a-farmer/farmer/4002

Date and Time:

Saturday June 12th. Students will leave Buffalo at 8am, with an arrival planned for a little after 9:30. Amy and Mo will share a little bit about the group with the tour guides at the start of the visit and guide the tour and discussion with the questions above. After a 1-1.5 hour tour, students will depart back to Buffalo, with an anticipated arrival around noon.

Farm Address: 3813 Baker Valley Rd, Belmont, NY 14813

Synopsis (1-2 sentences about the workshop):

Students will have an opportunity to tour Emma Smalley's goat farm. There will be an opportunity to view the barn, goats, and pastures and ample time will be available for students to ask questions.

Learning Objectives:

- Learn the basics of getting started with goats
- Understand the differences between a dairy goat and meat goat operation
- How to source goat kids and breeding stock in SWNY
- Introduction to pasture management of goats
- Learn about feed requirements for goats
- View a meat goat herd
- Ask questions to the expert!

Materials*:

- Hand-outs on:
    - Supplies needed to get started
    - Disease Free Goat Purchasing Guide
    - Places to purchase goat kids and breeders in WNY
    - Humane Slaughter Guide
    - Sheet for students to take notes

- Writing utensil
- Question sheet for Amy and Mo to lead discussion:
    - How did you get started and how long have you been raising goats?
    - Why did you decide to raise goats?

- How many goats did you start with?
- What do I need to do to start raising goats for meat (startup needs, costs, considerations)?
- What kind of barn do you need to get started? What condition should it be in? Should I be concerned about air circulation?
- What kind of fencing is needed to keep goats on pasture?
- Differences in raising goats for meat vs milk
- How much do you feed the goats? Cost of feed per month or year?
- Cost and amount of hay needed? Do goats need good quality hay? Do they need grain?
- Do you need a specialist or veterinarian for your goats? How often does the veterinarian need to come out?
- How do you manage internal parasites? Are they a big problem in your goats?
- Any financial numbers/examples, successes, and challenges you can share would be great!
- Running an operation through purchase of kids vs. breeding?

Procedure**:

Students will arrive at Emma Smalley's farm at 9:30am. Amy and Mo will share a little bit about the group to the tour guides at the beginning of the visit, and will assist in guiding the tour and discussion with the questions above. Students will depart at 11:00am.

*Should include any handouts needed for the workshop, associated record keeping templates, additional handouts/resources to further learning.

**Lessons should end with enough time to facilitate peer-to-peer learning and discussion.

Workshop Lesson Plan

Title: Pig Farm Tour at NK Show Hogs

Presenter (profile):

Nicholas Kron grew up on his family's livestock farm, Sunny Hill Farm, in Alden NY, and is currently the owner and operator of NK Show Hogs. Nick has been breeding swine for the past 12 years in his farrow-to-finish operation. Most recently, he is working to start his own custom exempt red meat slaughter and processing plant.

Date and Time:

June 13th, 2021, from 2pm - 3:15pm at the Kron family farm located at 1036 Townline Road, Alden, 14004

Synopsis (1-2 sentences about the workshop):

Students will have an opportunity to tour the farrow-to-finish operation of Nicholas Kron's NK Show Hogs. There will be an opportunity to view the facilities and pigs, with ample time available for students to ask questions.

Learning Objectives:

- Learn the basics of starting a small-scale hog operation, including start-up costs, equipment needs, time commitments, and annual care.
- Understand what is needed for buying hogs in, and what characteristics to look for in piglets.
- Learn the lifecycle of a pig
- Introduce the economics of raising hogs from weaned piglets
- Tour a farrow-to-finish operation
- Ask questions to the expert!

Materials*:

- Hand-outs on:
    - Common pig breeds with defining characteristics
    - Sheet for students to take notes
- Writing utensil
- Questions for Amy and Mo to lead the discussion:
    - History of your operation
    - What do you need to get started raising pigs (startup needs, costs, considerations)?
    - Indoor vs outdoor rearing - space?

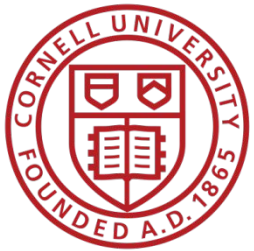
- What are the costs associated with raising pigs?
- Labor/time for a small pig operation?
- How long does it take a piglet to go from weaning to market weight?
- Could you share your knowledge on different pig breeds and their rearing and meat characteristics?
- What are the common issues experienced by small scale hog farmers?
- Advice for farmers who will purchase and raise piglets, not breeding?
- Experience, ideas, regulations on butchering and marketing.
- Any financial numbers/examples, successes, and challenges you can share would be great!

Procedure**:

Students will arrive at Nicholas Kron's farm at 2pm. Amy and Mo will share a little bit about the group to the group tour guides at the beginning of the visit and guide the tour and discussion with the questions above. Students will depart the farm at 3:15pm.

*Should include any handouts needed for the workshop, associated record keeping templates, additional handouts/resources to further learning.

**Lessons should end with enough time to facilitate peer-to-peer learning and discussion.

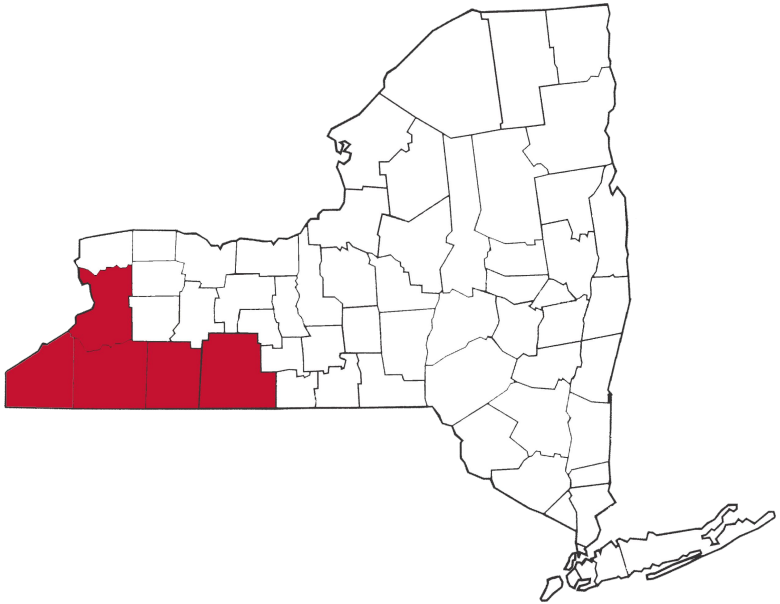


Cornell Cooperative Extension

Amy Barkley

Livestock and Beginning Farm Specialist

The **Southwest New York Dairy, Livestock & Field Crops Program** is a Cornell Cooperative Extension partnership between Cornell University and the CCE Associations in 5 counties.



Providence Farm Collective Meat Chicken Project

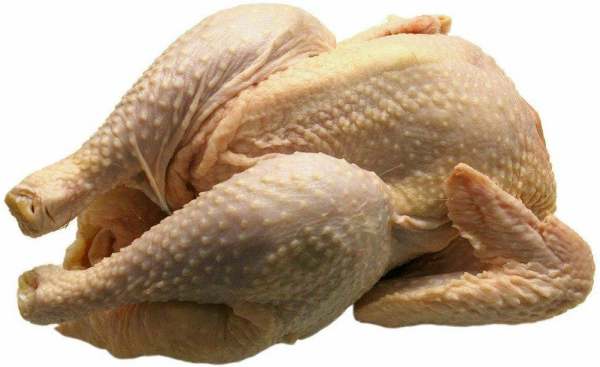
Week 1 – May 14th, 5pm
Brooding, Rearing, Making Housing

Chicks arrive on May 18th – 21st

Week 2 – June 5th, 10am
Health and Nutrition

Week 3 – July 24th, 10am
Food Safety, Labeling, Marketing, and Business

Week 3 – August 14th, 7am Processing and Packaging



Today's Class Schedule

I. Types of meat chickens
II. Brooding Chicks
III. Raising chickens on pasture
IV. Fixing up brooder coop for chicks
V. Making a brooder and pasture pen

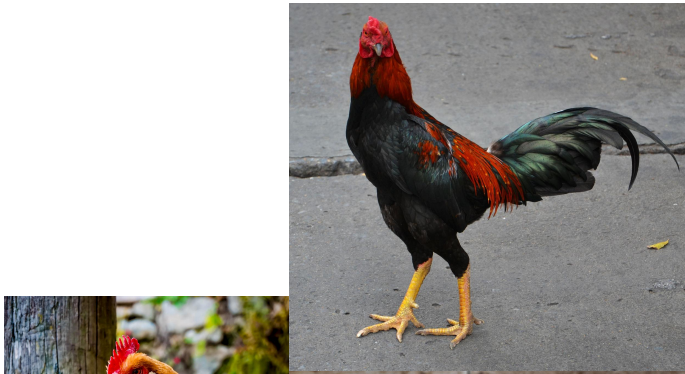
Types of Meat Chickens

Types of Meat Chickens – Fast Growth

- Cornish Cross
- Matures in 6 – 8 weeks
- Weighs 5-6 lbs (2.25 – 2.75kg) live
    - 4- 4.5 lbs (1.8 – 2kg) dressed
- Mostly breast meat
- Least flavor
- Soft, tender texture

Types of Meat Chickens – Heritage

- Many Breeds (Orpington, Rock, Wyandotte, others)
- Matures in 18-22 weeks
- Weighs 4-5 lbs (1.8 – 2.25 kg) live
  - 3-3.5 lbs (1.4 – 1.6 kg) dressed
- Mostly leg and thigh meat.
- More bones, less meat
- Excellent flavor
- Firm, sometimes chewy texture



Types of Meat Chickens – Medium Growth

- Red Ranger, Kosher King, Freedom Ranger
- Matures in 12 weeks
- Weighs 5-6 lbs (2.25 – 2.75kg) live
  - 4- 4.5 lbs (1.8 – 2kg) dressed
- Mostly leg and thigh meat
- Good flavor
- Medium texture

Photos from Freedom Ranger Hatchery

Heritage (Slow Growth) Chicken

Cornish (Fast Growth) Chicken

Photo from: Happy Wife Acres

Brooding Chicks

What is a brooder?

Preparing the Brooder

Items you will need:

Brooder box or barn

Bedding

Light/Heat Source

Chick starter feed

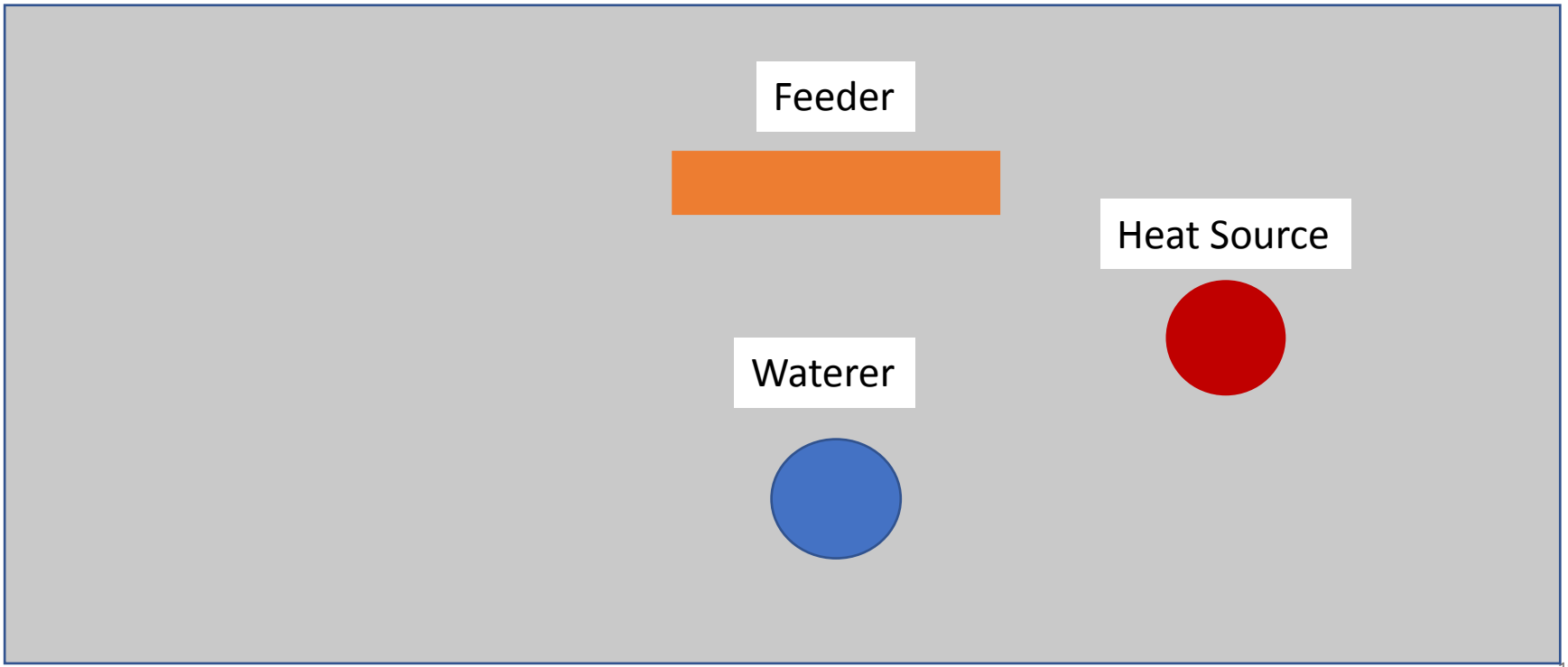
Water

Prepare the brooder ahead of time!

Brooder Space

- Large enough to accommodate chicks, waterer, and feeder
  - Room for chicks to comfortably move around
- Prepare the floor
  - Wood chips, paper towel, strav

Brooder Set-Up

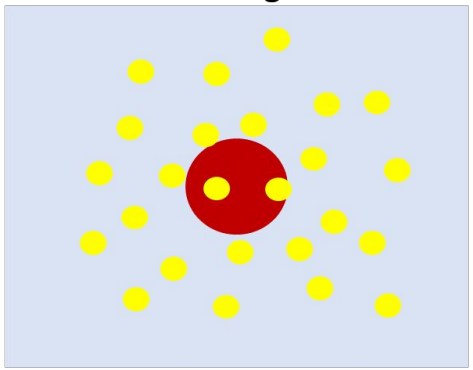


Light

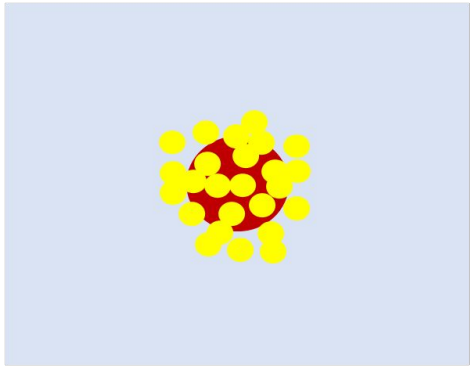
- White or red
- Intensity – 250W
- Heat & Light Combo

Chick Comfort Chart

Just Right



Too Cold



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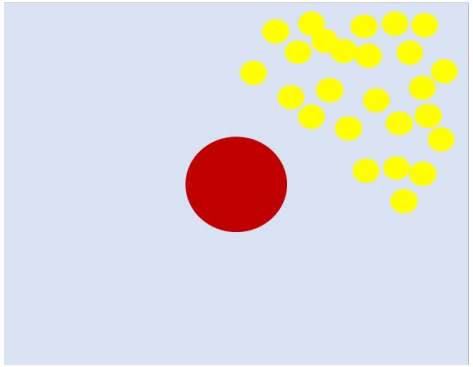
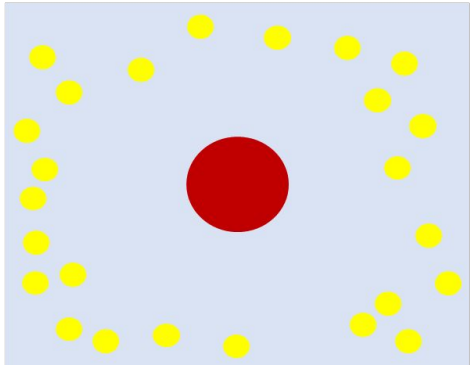


Too Hot



Key

- Chick
- Heat Source

Heat Lamp Safety

- Use lamps and bulbs rated for heating
- Make sure heat source is at least 24” away from wood, bedding
- Secure lamps to hanger
- Lamps should be complete and fully functioning

Three Styles of heat lamps least expensive and riskiest (left) to most expensive and safest (right).

Lowering Heat to Prepare for Life on Pasture

- Start brooder at 95ºF at level of chicks' backs.
  - Decrease by 10ºF each week
  - Fully feathered at 4 weeks
    - Can go outside if nights above 50ºF

4-Week-Old Freedom Rangers

Photo from Kendra, Life on a Homestead

Keeping the Brooder Clean and Dry

- Clean as brooder becomes dirty
- Increase ventilation to reduce odor and ammonia
  - May need to compensate for lost heat
- Add additional bedding as needed

When are Chickens Old Enough to go onto Pasture?

Week 1

Week 2

When are Chickens Old Enough to go onto Pasture?

Week 3

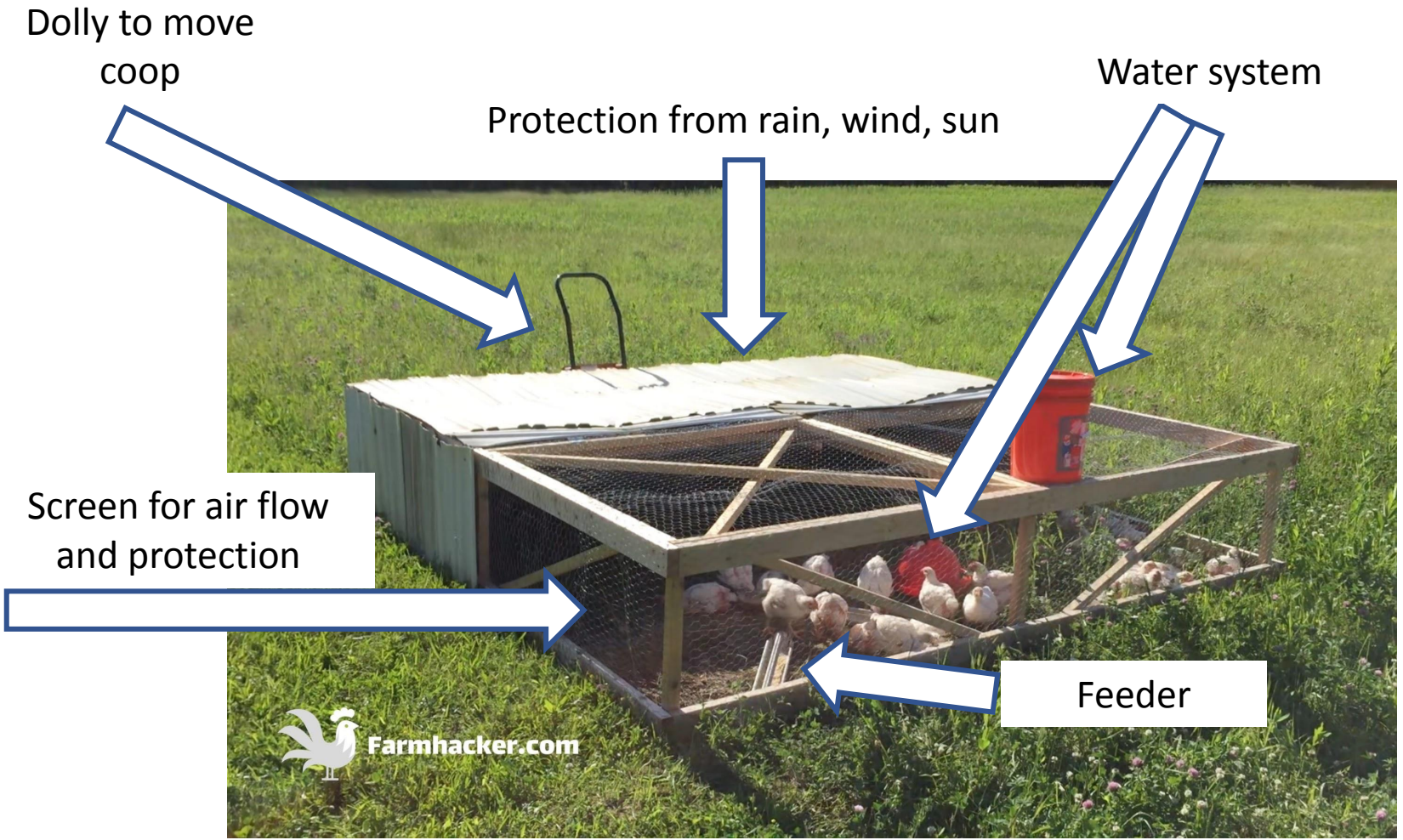
Week 4

When are Chickens Old Enough to go onto Pasture?

Chicks can go out if:

- ✓ Chicks should be nearly fully feathered.
- ✓ Ok to be missing some head and back feathers
- ✓ Nighttime temperatures should not go below 50°F

What a Pasture Coop Looks Like

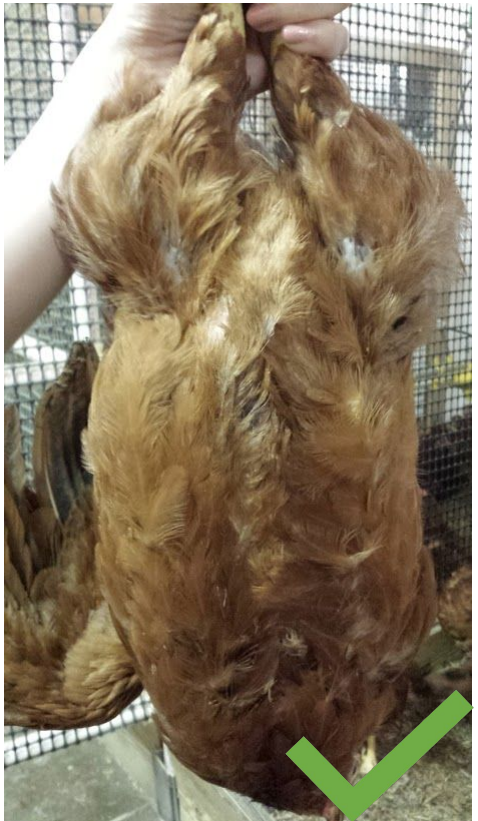

Dolly to move coop
Protection from rain, wind, sun
Water system
Screen for air flow and protection
Feeder
Farmhacker.com

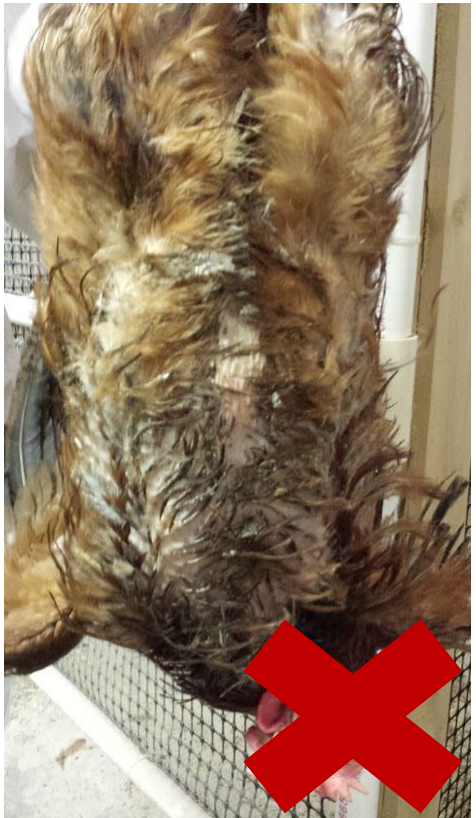
Moving Chickens on Pasture

- Move when grass is pooped on and stamped down
  - 2-3 days when 4-6 weeks
  - 1-2 days when 6-8 weeks
  - Daily after 8 weeks

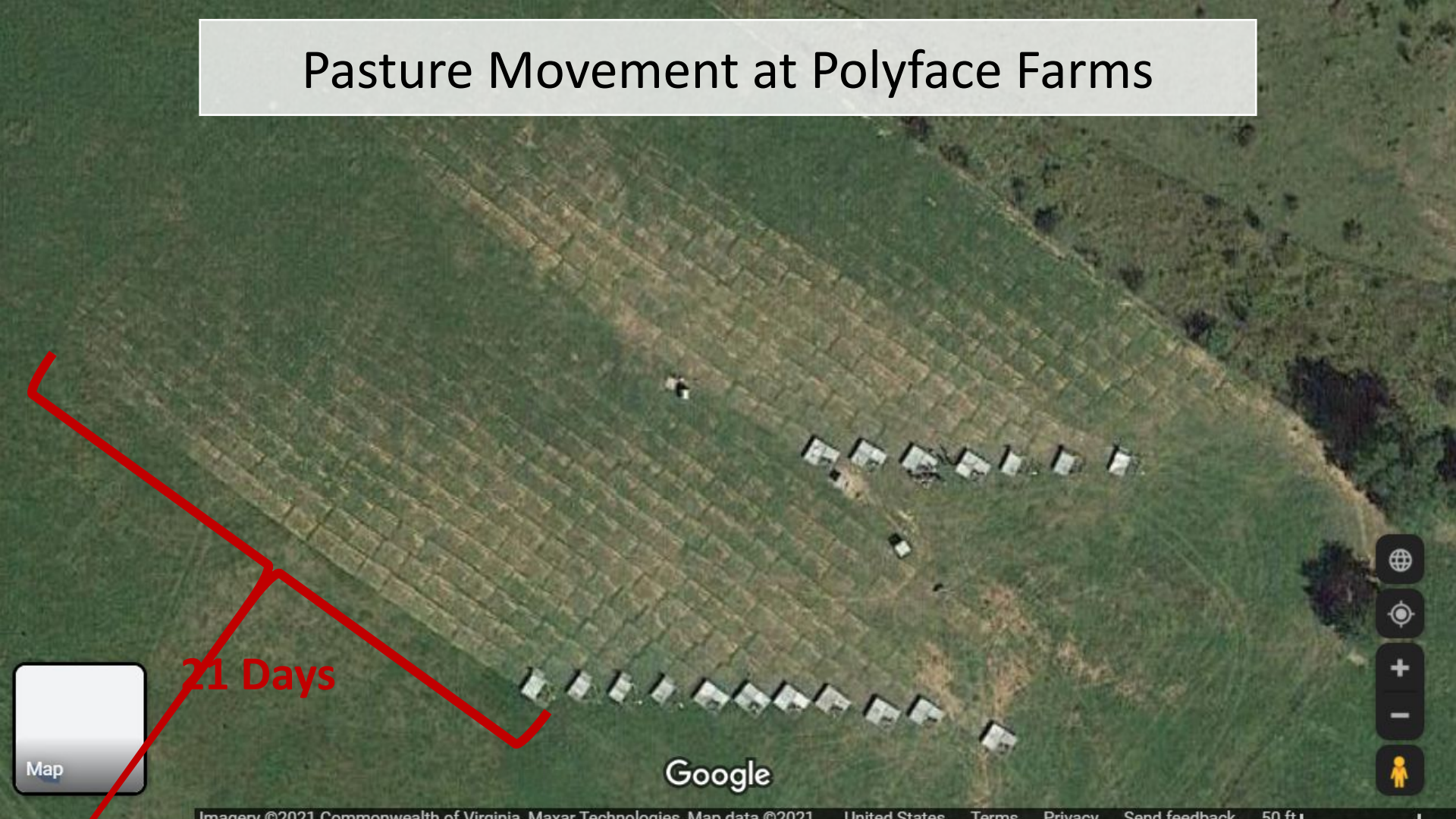
Move the Coop More Often When...

- Rainy, wet weather
- Breast feathers become dirty





Pasture Movement at Polyface Farms



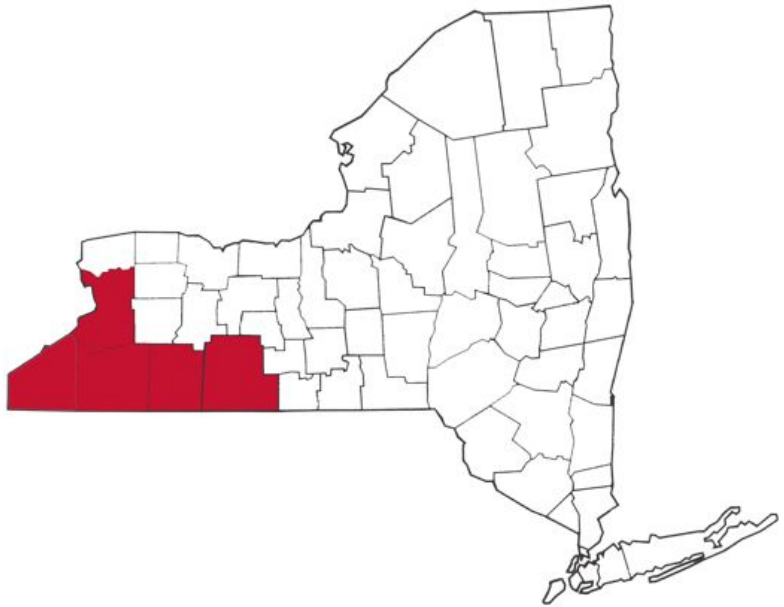
Amy Barkley

Livestock and Beginning Farm Specialist

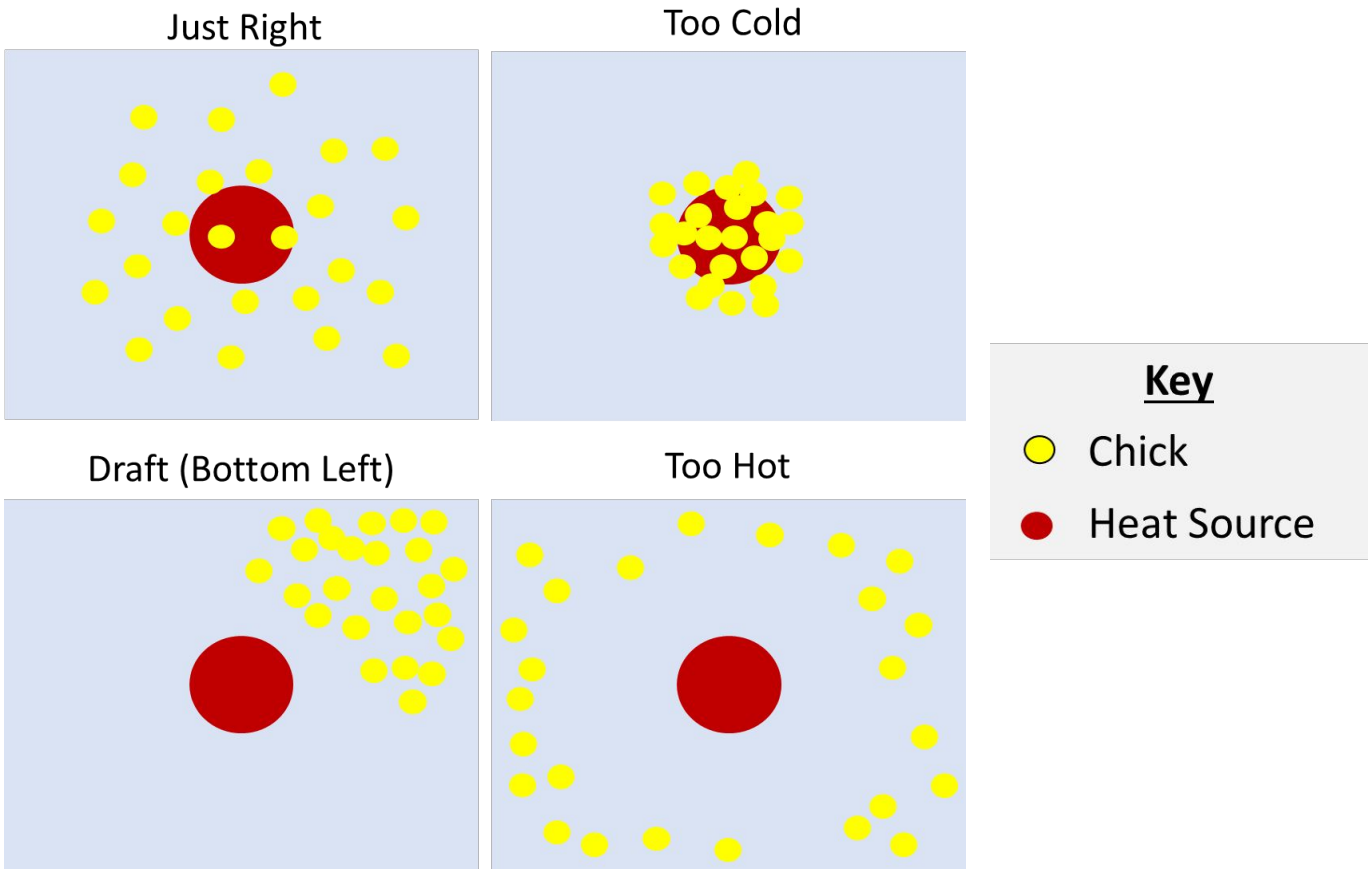
https://swnydlfc.cce.cornell.edu/

For localized assistance, be sure to reach out to your county's cooperative extension association or regional team

The **Southwest New York Dairy, Livestock & Field Crops Program** is a Cornell Cooperative Extension partnership between Cornell University and the CCE Associations in 5 counties.



Chick Comfort Chart



Brooder Temperature by Week For Broiler Chicks

Chick Age	Temperature Under Heat Source
1 Week	95°F
2 Weeks	85°F
3 Weeks	75°F
4 Weeks	65°F

Lower the temperature by raising the heat lamp

Chick Feathering by Week
When Can Chicks go on Pasture?

Week 1

Week 2

Week 3

Week 4

<u>Chicks can go out if:</u>

- ✓ Chicks should be nearly fully feathered.
- ✓ Ok to be missing some head and back feathers
- ✓ Nighttime temperatures should not go below 50ºF

Pasture Movement Guidelines

Age	How Often to Move
4-6 weeks	2-3 days
6-8 weeks	1-2 days
8-12 weeks	Daily

These are guidelines and depend on how many birds are stocked in the mobile coop

Move pen when grass is stomped down and poopy

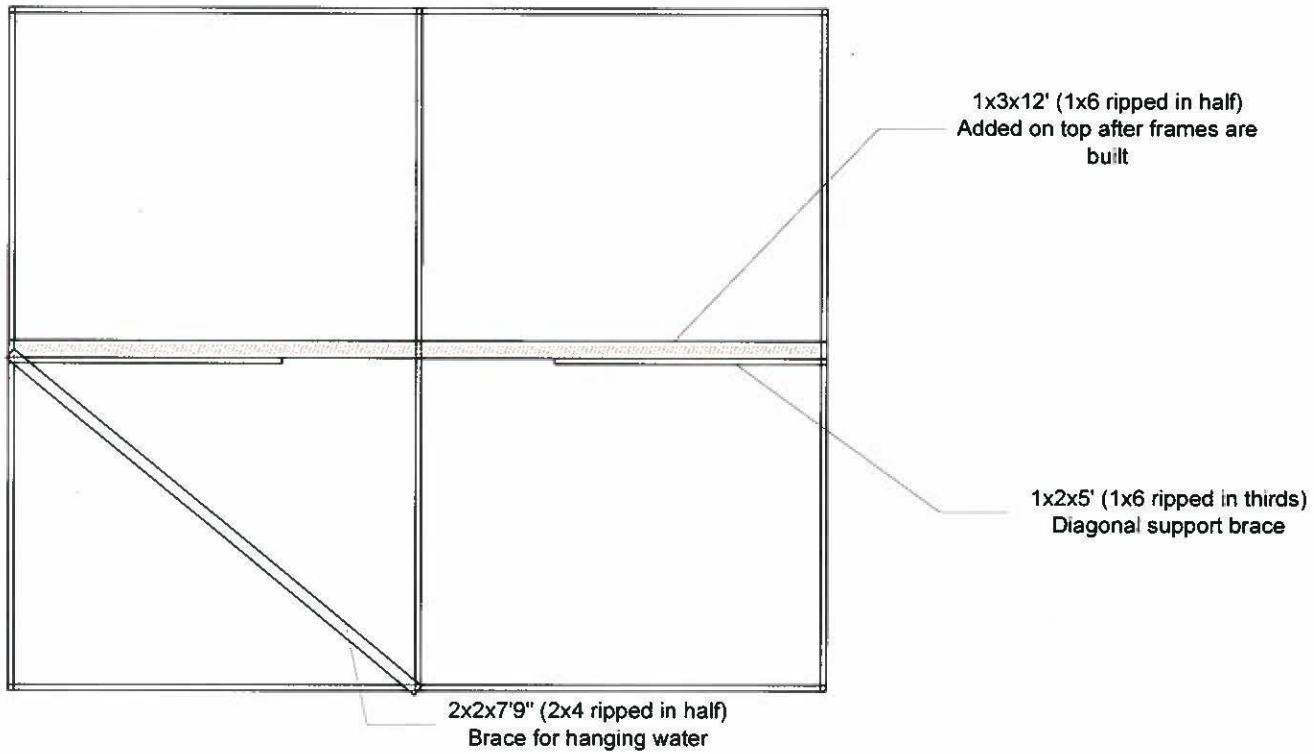
Move more often if:
Muddy in pen
Birds begin to become dirty

Salatin-Style Chicken Coop

Joel Salatin-Style Chicken Tractor Plans

Schematics by the Well Fed Homestead

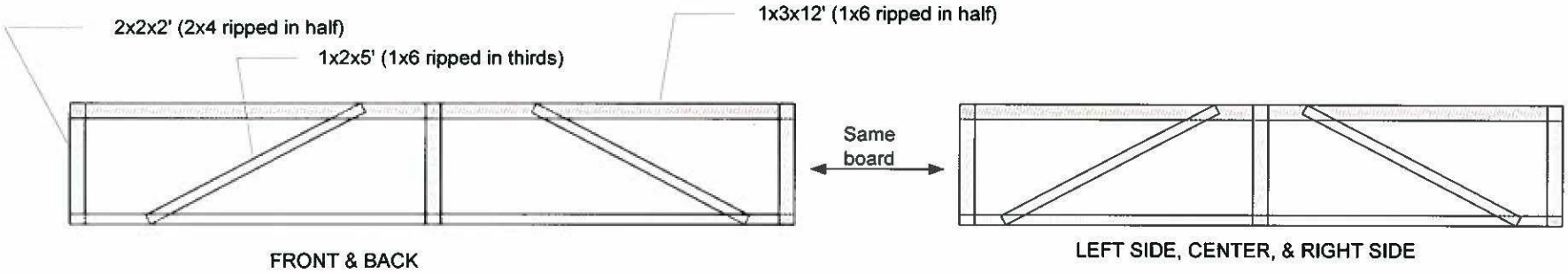
Full Coop Size: 12’ x 10’ x 2’



Material Needs List

Pressure Treated Lumber
2 – 2”x4”x8
1 - 2”x4”x10’
2 – 2”x4”x12’
3 – 1”x6”x10’
2 – 1”x6”x12’

1” poultry wire – 60’ from 4’ wide roll
5 – sheet aluminum 3’x8’ panels
100 – 1” plated tin screws
100 – 2.5” plated deck screws
150 ¾” hot dipped galvanized wire staples



Salatin-Style Chicken Tractor Cut List

Pressure Treated 2”x4”x8’ (2)

- Rip all boards into 1/2s
    - Cut two halves into 2’ pieces (results in 8 total pieces)
    - Cut two halves to length of 7’9”

** The eight 2’ sections to be used for corner and side supports for the frame
** One 7’9” piece to be used for the diagonal feeder hanger
** One 7’9” piece to be used for diagonal brace on lift lid

Pressure Treated 2”x4”x12’ (2)

- Rip all boards in half
    - Leave one half board as-is
    - Cut two half boards to 11’9”
    - Cut one half board into two pieces measuring 4’10.5” each

**1 board used as 12’ cross brace of top frame
**2 11’9” boards used for 12’ section of bottom frame
** 4’10.5” boards used as 5’ sides of lift lid

Pressure Treated 2”x4”x10’ (1)

- Rip board in half
    - Leave two resulting half boards as-is

** Both to be used as 10’ sides on bottom frame

Pressure Treated 1”x6”x12’ (2)

- Rip all boards in half
    - Leave 3 half boards as-is
    - Cut one half board in half to make two 6ft sections

** Three half boards used for 12’ section of top frame
** One half board used as 12’ cross brace of top frame
** Two 6-ft sections used for two sides of lift lid

Pressure Treated 1” x 6” x 10’ (3)

- Rip two boards into 3rds
    - Cut all 6 third boards in half to make 5’ pieces
- Rip one board in half
    - Cut both half boards to 9’,10.5”

** 12 boards cut to 5’ will be used for cross braces
** 2 boards cut to 9’, 10.5” will be used for 10’ top frame

Aluminum roofing (3’ x 8’) (5)

- Cut 2 panels into a total of 8 pieces that measure 2’ long
- Cut 3 panels to 5’6” long
    - There will be three pieces remaining that are 2’6” long

** 2-ft pieces will be used for sides
** The three 5’6” pieces will be used for roof
** The three 2’6” pieces will be shingled together to make the last panel for the roof

Brooder Cut Sheet

2 - 8'x4' Plywood – 3 ply (⅜")

- Leave one sheet as-is
- Cut two sheets in half lengthwise to make four half sheets that are 2'x8'
    - One half sheet will be extra
    - Two half sheets will be left as-is
    - One half sheet will be cut in half again to create 2 pieces of plywood that are 2'x4'
        - Trim ¾" off one side of each piece

6 – 2x4x8'

- 3 left as-is
- 2 ripped in half
    - Cut two half boards to 7',11¼" inches in length
    - Cut one half board into two pieces that are 3',8.5" long
    - Cut one half board into 4 pieces that are 22.5" long to secure corners
- 1 cut into 2 pieces that are 3',8.5" long

** 3 whole boards affixed under brooder floor to hold brooder off the floor

** 7',11¼" used on floor of brooder to secure sides to base on the long side
    - Lay so that short side of board is vertical

** 3',8.5" used on floor of brooder to secure sides to base on the short side
    - Lay so that short side of board is vertical

** Whole board cut into two 3',8.5" pieces to be supports in the middle top of the brooder

Per one Salatin-Style chicken tractor

- 2 – 2”x4”x8’ pressure treated
  - https://www.lowes.com/pd/Severe-Weather-Common-2-in-x-4-in-x-8-ft-Actual-1-5-in-x-3-5-in-x-8-ft-2-Prime-Treated-Lumber/4756851
  - $9.98/each – $19.96 total
- 1 - 2”x4”x10’ pressure treated
  - https://www.lowes.com/pd/Severe-Weather-Common-2-in-x-4-in-x-10-ft-Actual-1-5-in-x-3-5-in-x-10-ft-2-Prime-Treated-Lumber/4564610
  - $13.27 each - $13.27 total
- 2 – 2”x4”x12’ pressure treated
  - https://www.lowes.com/pd/Severe-Weather-Common-2-in-x-4-in-x-12-ft-Actual-1-5-in-x-3-5-in-x-12-ft-2-Prime-Treated-Lumber/4745791
  - $14.37 each - $43.11 total
- 3 – 1”x6”x10’ pressure treated
  - https://www.lowes.com/pd/Severe-Weather-Common-1-in-x-6-in-x-10-ft-Actual-0-75-in-x-5-5-in-x-10-ft-Appearance-Treated-Lumber/4745765
  - $7.98 - $23.94 total
- 2 – 1”x6”x12’ pressure treated
  - https://www.lowes.com/pd/Severe-Weather-Common-1-in-x-6-in-x-12-ft-Actual-0-75-in-x-5-5-in-x-12-ft-Appearance-Treated-Lumber/4745767
  - $11.88 each - $35.64 total
- 1” poultry wire (total of 96 sqft needed – a 60’ long 4’ wide roll or a 120’ 2 ft roll would work here)
  - https://www.lowes.com/pd/Garden-Zone-Actual-150-ft-x-2-ft-Gray-Steel-Chicken-Wire-Rolled-Poultry-Netting/1000552847
  - $36.98 each
- Sheet Aluminum – covers whole back half. Aluminum or plastic is preferred to tin because it makes the structure lighter and easier to move – 5 sheets that are 3’x8’ – Pricing at Lowes is high – I recommend going to a steel dealer. My local dealer is Sixt Lumber in Chaffee, who will cut the pieces to the exact sizes needed and is about half the price of Lowes. Lowes is used here as a reference to item, cost is estimated at half of Lowes’ cost.
  - https://www.lowes.com/pd/Union-Corrugating-3-17-ft-x-8-ft-Ribbed-Metal-Roof-Panel/3360808
    - $20.24/panel – $101.20
- Tin screws – about 100 - 1 pack needed
  - https://www.lowes.com/pd/Teks-9-x-1-in-Zinc-Plated-Zinc-Plated-Self-Drilling-Roofing-Screws-120-Count/3316530
  - $10.98
- Deck screws - 2.5” – 100 - need 2-1lb packs, or 1-5lb pack
  - https://www.lowes.com/pd/Deck-Plus-10-x-2-1-2-in-Ceramic-Deck-Screws-1-lb/1000760416
  - $9.48/pack - $12.60 for project
- ¾” hot dipped galvanized wire staples
  - https://www.lowes.com/pd/Grip-Rite-3-4-in-Leg-x-1-4-in-Round-Crown-Standard-Staples-1-lb/3043059
  - $4.48/pack

Total: $275.51

One of the items not included on this list is a dolly or similar piece of equipment (could also be pulls/rope) to move the structure. Just another cost to consider

For the brooder, I recommend a structure that's 8' long by 4' wide. This should fit 25-50 birds to 3 weeks. Materials needed are:

- 3 - 8'x4' Plywood – 5 ply (⅜")
    - https://www.lowes.com/pd/Plytanium-3-8-CAT-PS1-09-Square-Structural-Plywood-Pine-Application-as-4-x-8/1000068943
    - $50.98 each - $152.94 total
- 6 – 2x4x8'
    - https://www.lowes.com/pd/2-in-x-4-in-x-8-ft-Whitewood-Stud-Common-1-5-in-x-3-5-in-x-96-in-Actual/1000074211
    - $8.13 each - $48.78
- Wood screws – 1.5" - About 75 needed
    - https://www.lowes.com/pd/Fas-n-Tite-6-x-1-5-8-in-Yellow-Zinc-Flat-Interior-Wood-Screws-1-lb/1000765540
        - $6.98 (enough for 2 brooders)

Total: $208.70

- Chicks ($58.50 budgeted for 25 birds at $2.34ea)
    - Sounds reasonable, though it may be a little on the low side if you want to select breeds or go with the Freedom Rangers. Unfortunately, the price per bird is going to be higher because of the smaller quantity you are looking to order.
        - Cackle assortments would be the way to go for the heritage birds to keep them within the price range
        - Freedom Ranger Hatchery would be the way to go for middle-growth birds to keep costs within budget.
- Chick feed + broiler grower feed (I have a source in Delevan that's about 25% less than TSC) - ($136.50 budgeted for 6 bags at $22.75 - I got this number when I thought we would be raising cornish cross)
        - I think this number is on the high side for 50lb bags.
        - You can feed heritage broilers broiler feed. You can feed a chick grower too, since the birds grow slower and don't need as much protein as what is in broiler feed. Middle-growth broilers will do better on a broiler feed.

        - Feed consumption for heritage birds is going to be about 25 lbs/bird to 20 weeks of age, or about 12.5 50-lb bags of feed. Feed consumption for middle-growth birds is going to be
- 1 bag Wood shavings for brooder
- 2 heat lamps (these can be spendy if you opt for the safer ones, which I recommend) - I believe I have two I can lend to the project if needed
    - Great!
- 2 heat lamp bulbs - I believe I have two if we don't have enough funds
    - Sounds good
- Chick feeder - ($16 budgeted for 2 @$8 ea)
    - You may want to build a trough feeder for the older birds- this shouldn't be too difficult.
    - If you use 1 gallon waterers, which I think it what you budgeted for here, that would work for chicks and adult birds. You may need to fill the waters twice a day when the 25 birds get to processing size.
- Chick waterer ($14 budgeted for 2 @ $7 ea)
- **Bucket and bell drinker system for chicken tractors**
    - See comment above. My brain was thinking chick (quart) waterers – not gallon waterers (:
- Feeder pan or trough for chickens
    - You can build one of these, too, if you wanted to go that route.
- At least 2 very sharp quality knives (more if you want the capacity for multiple people to work at once), sharpening block, and sharpening steel
    - https://www.strombergschickens.com/product/boning-multipurpose-knife
- Large stock pot to heat scalding water and later to heat shrinkwrap packaging water (outdoor propane burner if you want to scald birds outside, which is recommended)
- Two plastic or stainless steel tables – one for the "clean" processing side, one for the "dirty" processing side/
- **Food-Safe bactericidal sanitizer**, bucket, and scrub brush
    - This can be dawn dish soap and hot water for the stainless steel and chlorine for any plastic. To be extra safe, you can spray things down in a 50/50 5% white vinegar/water solution as a sanitizer once they are washed and rinsed to kill any residual bacteria.
- Three sided structure for processing. This can be a barn. This can be a pop-up tent with sides. The big thing is that there are two separate areas – one for the side where the birds are killed and plucked, and one for the area where the birds are gutted, cooled and packaged. This is not important for home use, but is crucial for retail.
- 5 gallon buckets to catch blood, guts and waste water (unless waste water can flow directly into a treatment/septic system)
    - I also forgot to mention that if you are in a grassy field that the water (only "clean" waste water) can run onto the field.
- **1-2 restraining cones**
    - These are to hold the birds for a clean kill and bleed out. You can use traffic cones and milk jugs with a hole cut in the top and bottom too. By keeping the birds restrained, it's also less traumatic and reduces meat bruising and leg/wing disjointing from flapping so much. I would say that they're necessary unless you have another restraining/killing method in mind.
    - https://www.amazon.com/gp/product/B009S9EZ3M/ref=ppx_yo_dt_b_search_asin_title?ie=UTF8&psc=1

- 2 Large food-safe vessels (can be stainless or food safe plastic barrels with the tops removed, even) for chilling birds. One for pre-chill, one for post-chill.
- Thermometer (for scalding water)
- Ice – 3-5 pounds per bird processed
- Hose with dedicated spray head for processing connected to a potable water source
- **Shrink wrap bags** for finished birds – also called "broiler bags". This is for retail sales. Ziploc bags are fine for home use.
    - If you want to sell this batch of birds at all, then you'll have to use broiler bags. Because they are heat seal, there's a technique to using them that I'd like to share. I can bring a couple of mine for demonstration purposes if you would rather not invest in a lot right now. Here's where I get mine, FYI: https://www.strombergschickens.com/product/heat-shrink-bags-broiler-size. You'll also need zip ties to cinch the bag.

Preventing Disease Through Biosecurity

Biosecurity Principles for Small Farms

- Limiting visitors (and visiting other farms)
- Species separation
- Age separation
- Replacement poultry
- Wild birds, rodents, insects
- Water supplies
- Feed and replacement litter
- Cleaning and disinfection
- Mortality disposal
- Manure and litter management
- Borrowing equipment and vehicles
- Reporting elevated morbidity and mortality

Poultry Health Contact

Cornell Health Diagnostic Center

Contact Avian Health

240 Farrier Road
Ithaca, NY 14853

Phone: (607) 253-3900
Fax: (607) 253-3943
Email: poultryhealth@cornell.edu

Table of Disinfectants Used on the Farm

Chemical compound	Gram + Bacteria	Gran - Bacteria	TB-like Bacteria	Fungi	Virus	Best pH range for activity	Activity when organic matter present	Common uses **
Chlorhexidene	SA*	SA	SA	SA	Most	Wide range	Good	E/P/F
Formaldehyde and aldehydes	++	++	++	++	++	Wide range	Good	E/P/F
Chlorine Chloramines	++	++	SA	++	SA	Acid	Very poor	CS/E
Iodophors	++	++	SA	++	SA	Acid	Fair to poor	CS/E
Sodium hydroxide	++	++	SA	++	++	Alkaline	Good	P
Quaternary ammoniums	++	+	No	SA	SA	Alkaline	Fair	CS/E
Phenols	++	++	+	SA	SA	Acid	+Good	E/P/F

* SA-some activity

****E**-equipment; **P**-premises; **F**-footbaths; **CS**-clean surfaces

(Adapted from Purdue University Extension Bulletin PIH80)

Table from Penn State University Extension

What Should a Healthy Meat Bird Look Like?

Bright, clear eyes
No nasal discharge, bubbles in corners of eyes, or discharge around face
Clean, undamaged skin on combs, wattles, and face

Feet should be free of injuries
Toes should not be swollen
Foot pads should be even colored

Group of birds growing at the same rate
Birds of the same age about the same size

Bird can stand and walk without difficulty
Legs and toes are straight
Hock joints aren't swollen

Clean breast feathers
Some adhering dirt OK

Common Poultry Diseases

Aspergillosis (Brooder Pneumonia)

Cause: A fungus that is found in moldy, wet feed or bedding
Symptoms: Difficulty breathing/gasping in young chicks. Neck outstretched.
Treatment: Individual treatment not practical. Remove mold source and clean & disinfect coop.
Contagious: No

Fowl Cholera

Cause: A bacteria carried by rodents, wild birds, predators, pet cats or dogs
Symptoms: 1.) Birds get sick fast, and many birds will die OR 2.) Swelling around body, mucous or liquid coming out of nostrils or mouth, birds look sickly and don't grow
Treatment: Kill all birds in the flock, and cleaning & disinfect their living area. Antibiotics can help make symptoms better, but don't cure the disease
Contagious: Yes

Avian Influenza

Cause: Virus that is spread by waterfowl
Symptoms: Many different symptoms, including high death loss, respiratory disease, hemorrhages (bruised spots) on body, swollen head
Treatment: None. Call the vet. All birds may have to be killed if it is a highly pathogenic strain
Contagious: Extremely

REPORTABLE DISEASE

Fowl Pox

Cause: Virus
Symptoms: Dry form - bumpy scabs on unfeathered skin. Wet form - scabs in mouth, throat, and trachea. Death rate can be low or high
Treatment: None. If this is confirmed on the farm, all incoming birds need to be vaccinated for it.
Contagious: Yes.

Common Poultry Diseases

Poultry DVM

Poultry DVM

Erysipelas

Cause: Bacteria in contaminated soil
Symptoms: Sudden death, depressed birds, swollen hocks, diarrhea, weakness
Treatment: None. Only supportive treatments available. Kill birds, clean & disinfect coop
Contagious: Yes

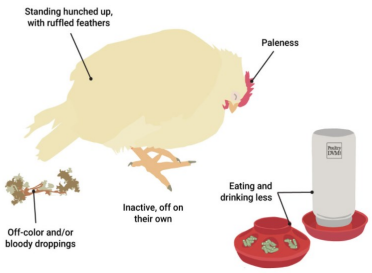
CAN INFECT HUMANS

Merk Veterinary Manual

Infectious Laryngotracheitis (ILT)

Cause: Virus
Symptoms: Highly contagious type: respiratory distress including gasping, rattling, bloody mucous, extension of neck; death rate up to 50%. Less Contagious Type: mild respiratory signs, small death rate
Treatment: None. Vaccination is effective.
Contagious: Highly contagious

REPORTABLE DISEASE



Poultry DVM

Coccidiosis

Cause: Protozoa - found in the soil. Birds that eat infected soil become sick
Symptoms: Intestinal lesions, abnormal droppings, poor doers
Treatment: Coccidiostats, natural recovery
Contagious: Yes - Highly

COURTESY OF DR. PATRICIA WAKENELL.

COURTESY OF DR. JEAN SANDER.

COURTESY OF DR. JEAN SANDER.

Marek's

Cause: Virus
Symptoms: Internal tumors, paralysis, depression
Treatment: None available. Vaccination is effective
Contagious: Yes - Highly

Euthanasia (Culling)

When to Euthanize

Bad Joints
Hard time walking, painful

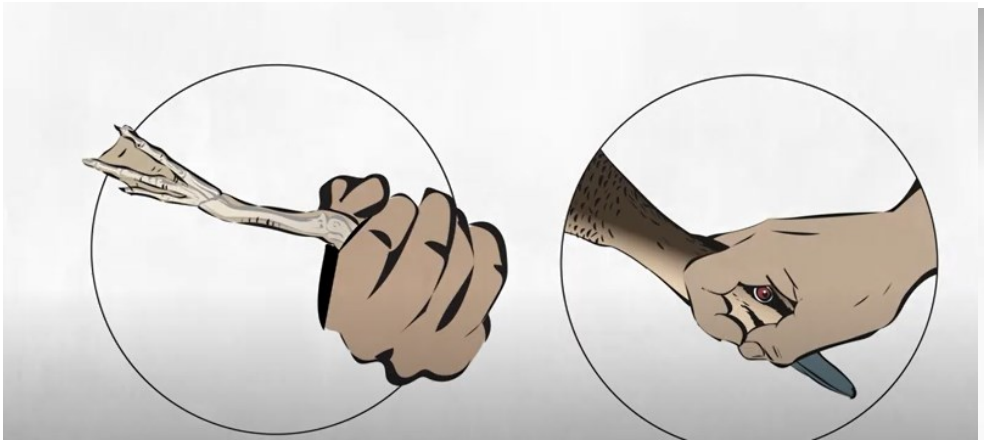
Runts
Small, usually depressed

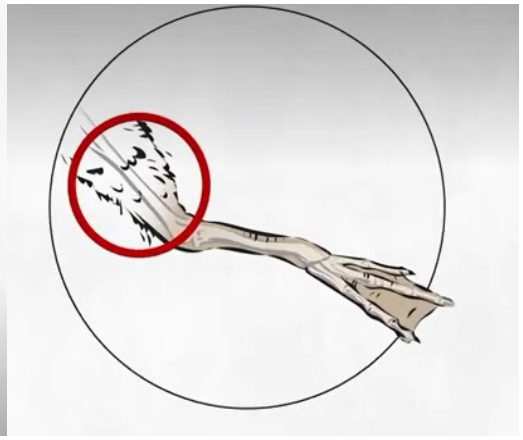
<u>Severely injured birds</u>
Predator attacks
Birds caught under tractor
Broken bones

How to Properly Cull a Bird

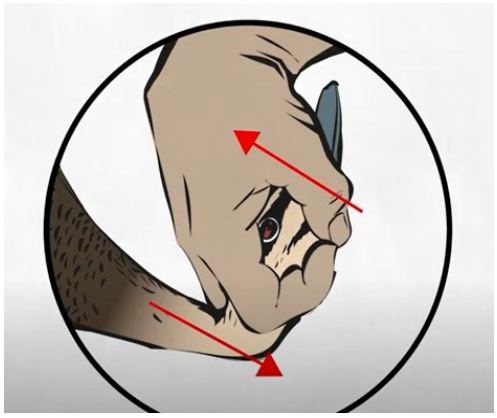
Cervical Dislocation

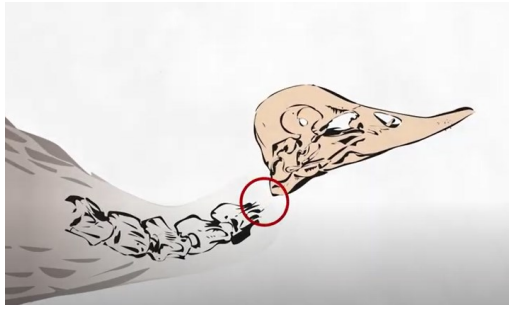
Screen captures from "How to perform the cervical dislocation method"
By: Game Management Authority





Step 1: Hold bird above the hock joint. One hand will hold both legs together.
Step 2: Hold head between fingers of the opposite hand such that your thumb is below the bird's chin and at least one finger is at the back of the bird's head at the base of the skull





Step 3: Gently straighten the neck straight by pulling the feet and head in opposite directions.
Step 4: Pull the head downward and at a 90-degree angle, firmly, and with one motion
Step 5: The head should detach from the base of the spine. Feel in-between the head and neck to be sure no bone is in the gap. The pupil should be dilated and the bird will not flinch if you touch the eyeball.

Poultry Nutrition

Feeding Parameters for Commercial Broilers

Phase	Protein (%)	Methionine (%)	Lysine (%)	Calcium (%)	Phosphorous (%)	Feed Type
Starter/Grower (0 - 3 weeks)	19 - 23	0.45 - 0.56	1.12 - 1.44	0.84 - 0.96	0.42 - 0.48	Crumble
Finisher (3+ weeks)	17 - 20	0.40 - 0.48	1.02 - 1.19	0.76 - 0.81	0.38 - 0.41	Pellet

Information from commercial production tables

Protein: Builds muscle, strengthens joints, allows for proper feathering

Methionine and Lysine: Amino acids– building blocks of protein required for animal growth

Carbohydrates: Needed for energy for growth and for building fat reserves

Vitamins and Minerals: Required for many body functions and proper growth and development

Calcium and Phosphorus: Builds bone, helps in muscle regulation

Fat: Provides energy and keeps feed

Photo: Merk Veterinary Manual

Slipped Tendon

Caused by: Too fast growth, injury, improper vitamins/minerals in feed

Prevention: Feed a nutritionally complete feed, make sure birds don't slip on flooring, selecting slower growth strains

Photo: PoultryDVM

Curled Toes

Caused by: Genetics, injury, improper vitamins/minerals in feed

Prevention: Feed a nutritionally complete feed

Photo: MSD Veterinary Manual

Green Muscle Disease

Caused by: Injury prior to processing. Usually seen in breast muscle.

Prevention: Low stress environment, gentle handling

These are management and nutrition-related, not disease related

Feed Components and Types

Energy

Corn

Wheat

Oats

Protein

Soybean Meal

Wheat Middlings

Vitamins and Minerals

Ground Limestone

Vitamin-Mineral Premix

Salt

Other Additions

Oil

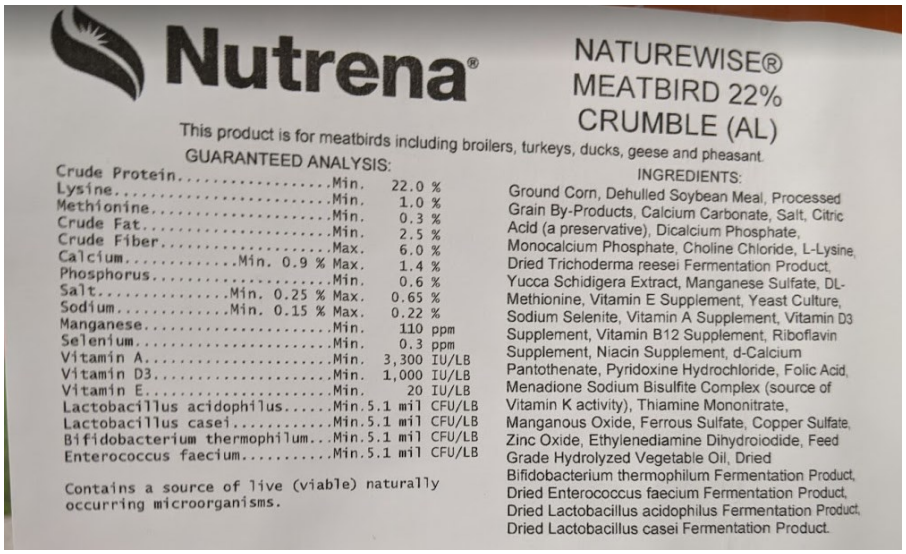
Probiotics

Diatomaceous Earth or other clay binder

Marigold, or other pigmenter

Photos from University of Kentucky Extension unless otherwise noted

Reading Feed Tags for Meat Chickens



Nutrena®

NATUREWISE®
MEATBIRD 22%
CRUMBLE (AL)

This product is for meatbirds including broilers, turkeys, ducks, geese and pheasant.

GUARANTEED ANALYSIS:

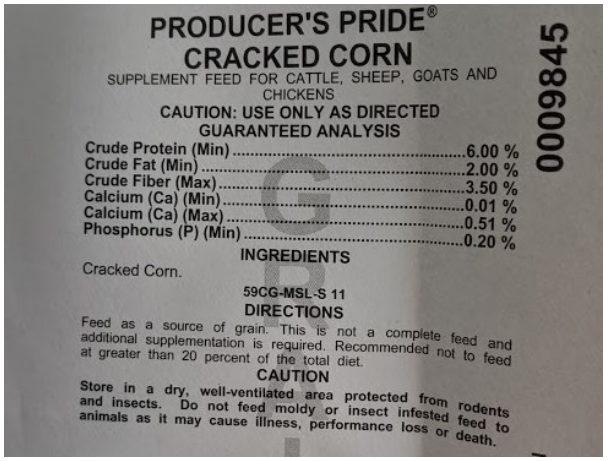
Crude Protein	Min.	22.0 %
Lysine	Min.	1.0 %
Methionine	Min.	0.3 %
Crude Fat	Min.	2.5 %
Crude Fiber	Max.	6.0 %
Calcium	Min. 0.9 % Max.	1.4 %
Phosphorus	Min.	0.6 %
Salt	Min. 0.25 % Max.	0.65 %
Sodium	Min. 0.15 % Max.	0.22 %
Manganese	Min.	110 ppm
Selenium	Min.	0.3 ppm
Vitamin A	Min.	3,300 IU/LB
Vitamin D3	Min.	1,000 IU/LB
Vitamin E	Min.	20 IU/LB
Lactobacillus acidophilus	Min.	5.1 mil CFU/LB
Lactobacillus casei	Min.	5.1 mil CFU/LB
Bifidobacterium thermophilum	Min.	5.1 mil CFU/LB
Enterococcus faecium	Min.	5.1 mil CFU/LB

Contains a source of live (viable) naturally occurring microorganisms.

INGREDIENTS:

Ground Corn, Dehulled Soybean Meal, Processed Grain By-Products, Calcium Carbonate, Salt, Citric Acid (a preservative), Dicalcium Phosphate, Monocalcium Phosphate, Choline Chloride, L-Lysine, Dried Trichoderma reesei Fermentation Product, Yucca Schidigera Extract, Manganese Sulfate, DL-Methionine, Vitamin E Supplement, Yeast Culture, Sodium Selenite, Vitamin A Supplement, Vitamin D3 Supplement, Vitamin B12 Supplement, Riboflavin Supplement, Niacin Supplement, d-Calcium Pantothenate, Pyridoxine Hydrochloride, Folic Acid, Menadione Sodium Bisulfite Complex (source of Vitamin K activity), Thiamine Mononitrate, Manganous Oxide, Ferrous Sulfate, Copper Sulfate, Zinc Oxide, Ethylenediamine Dihydroiodide, Feed Grade Hydrolyzed Vegetable Oil, Dried Bifidobacterium thermophilum Fermentation Product, Dried Enterococcus faecium Fermentation Product, Dried Lactobacillus acidophilus Fermentation Product, Dried Lactobacillus casei Fermentation Product.

Complete Meat Bird Feed



PRODUCER'S PRIDE®
CRACKED CORN

SUPPLEMENT FEED FOR CATTLE, SHEEP, GOATS AND CHICKENS

CAUTION: USE ONLY AS DIRECTED

GUARANTEED ANALYSIS

Crude Protein (Min)	6.00 %
Crude Fat (Min)	2.00 %
Crude Fiber (Max)	3.50 %
Calcium (Ca) (Min)	0.01 %
Calcium (Ca) (Max)	0.51 %
Phosphorus (P) (Min)	0.20 %

INGREDIENTS

Cracked Corn.

59CG-MSL-S 11

DIRECTIONS

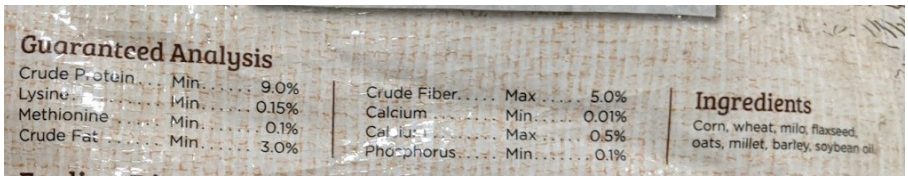
Feed as a source of grain. This is not a complete feed and additional supplementation is required. Recommended not to feed at greater than 20 percent of the total diet.

CAUTION

Store in a dry, well-ventilated area protected from rodents and insects. Do not feed moldy or insect infested feed to animals as it may cause illness, performance loss or death.

0009845

NOT a complete feed



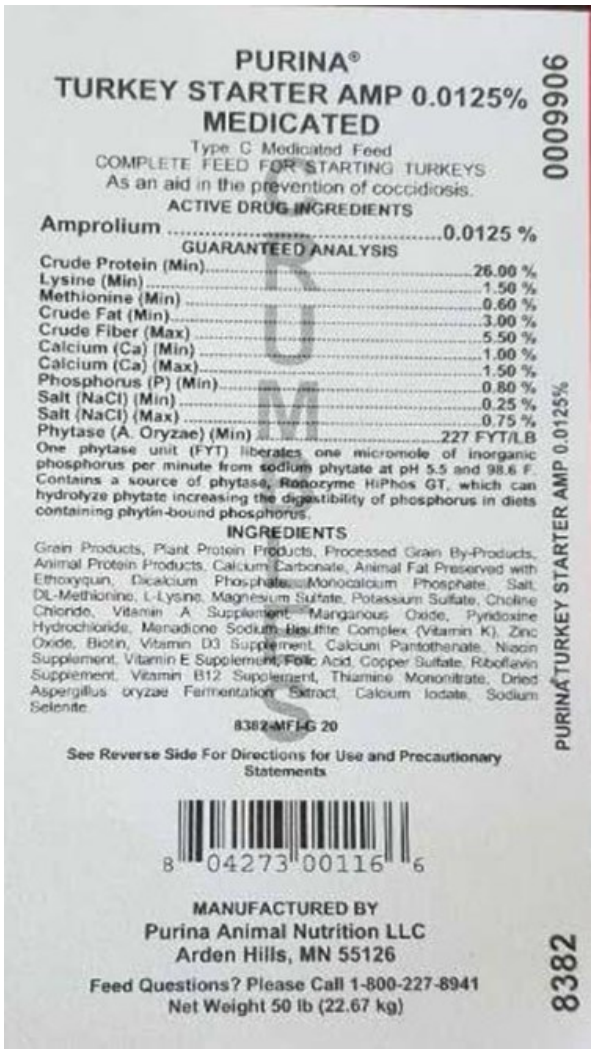
Guaranteed Analysis

Crude Protein	Min.	9.0%	Crude Fiber	Max	5.0%
Lysine	Min.	0.15%	Calcium	Min.	0.01%
Methionine	Min.	0.1%	Calcium	Max	0.5%
Crude Fat	Min.	3.0%	Phosphorus	Min.	0.1%

Ingredients

Corn, wheat, milo, flaxseed, oats, millet, barley, soybean oil.

NOT a complete feed



PURINA®
TURKEY STARTER AMP 0.0125% MEDICATED

Type C Medicated Feed
COMPLETE FEED FOR STARTING TURKEYS
As an aid in the prevention of coccidiosis.

ACTIVE DRUG INGREDIENTS

Amprolium	0.0125 %

GUARANTEED ANALYSIS

Crude Protein (Min)	26.00 %
Lysine (Min)	1.50 %
Methionine (Min)	0.60 %
Crude Fat (Min)	3.00 %
Crude Fiber (Max)	5.50 %
Calcium (Ca) (Min)	1.00 %
Calcium (Ca) (Max)	1.50 %
Phosphorus (P) (Min)	0.80 %
Salt (NaCl) (Min)	0.25 %
Salt (NaCl) (Max)	0.75 %
Phytase (A. Oryzae) (Min)	227 FYT/LB

One phytase unit (FYT) liberates one micromole of inorganic phosphorus per minute from sodium phytate at pH 5.5 and 98.6 F. Contains a source of phytase, Ronozyme HiPhos GT, which can hydrolyze phytate increasing the digestibility of phosphorus in diets containing phytin-bound phosphorus.

INGREDIENTS

Grain Products, Plant Protein Products, Processed Grain By-Products, Animal Protein Products, Calcium Carbonate, Animal Fat Preserved with Ethoxyquin, Dicalcium Phosphate, Monocalcium Phosphate, Salt, DL-Methionine, L-Lysine, Magnesium Sulfate, Potassium Sulfate, Choline Chloride, Vitamin A Supplement, Manganous Oxide, Pyridoxine Hydrochloride, Menadione Sodium Bisulfite Complex (Vitamin K), Zinc Oxide, Biotin, Vitamin D3 Supplement, Calcium Pantothenate, Niacin Supplement, Vitamin E Supplement, Folic Acid, Copper Sulfate, Riboflavin Supplement, Vitamin B12 Supplement, Thiamine Mononitrate, Dried Aspergillus oryzae Fermentation Extract, Calcium Iodate, Sodium Selenite.

8382-MFI-G 20

See Reverse Side For Directions for Use and Precautionary Statements

8 04273 00116 6

MANUFACTURED BY
Purina Animal Nutrition LLC
Arden Hills, MN 55126

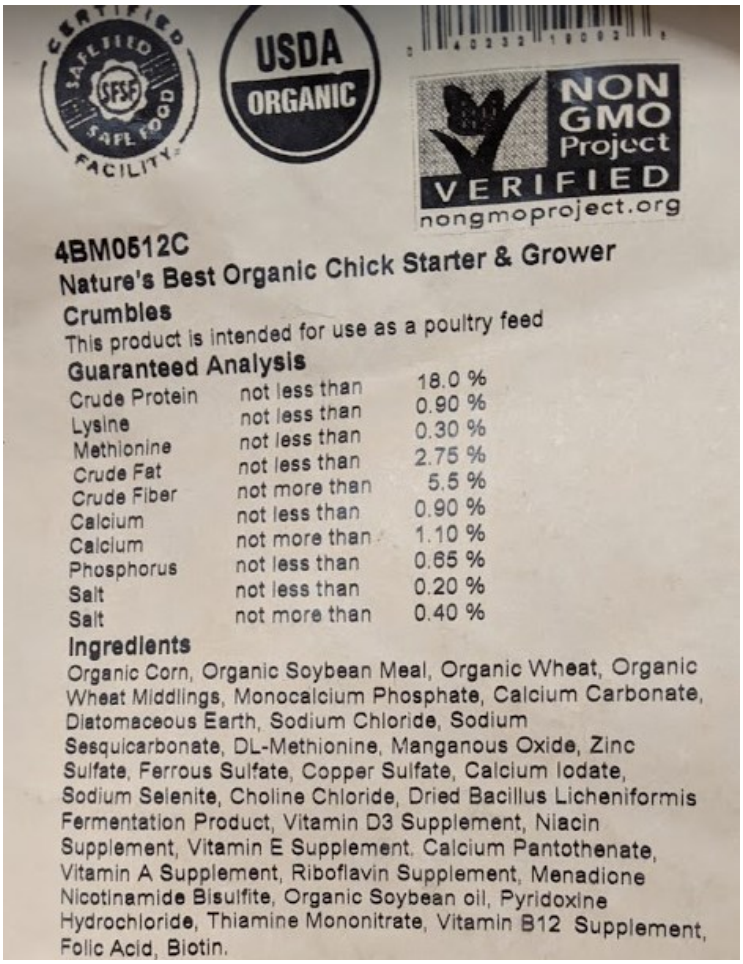
Feed Questions? Please Call 1-800-227-8941
Net Weight 50 lb (22.67 kg)

0009906

PURINA TURKEY STARTER AMP 0.0125%

8382

Complete, Medicated Starter-Grower



CERTIFIED SAFE FOOD FACILITY (SFSF)

USDA ORGANIC

NON GMO Project VERIFIED
nongmoproject.org

4BM0512C

Nature's Best Organic Chick Starter & Grower

Crumbles

This product is intended for use as a poultry feed

Guaranteed Analysis

Crude Protein	not less than	18.0 %
Lysine	not less than	0.90 %
Methionine	not less than	0.30 %
Crude Fat	not less than	2.75 %
Crude Fiber	not more than	5.5 %
Calcium	not less than	0.90 %
Calcium	not more than	1.10 %
Phosphorus	not less than	0.65 %
Salt	not less than	0.20 %
Salt	not more than	0.40 %

Ingredients

Organic Corn, Organic Soybean Meal, Organic Wheat, Organic Wheat Middlings, Monocalcium Phosphate, Calcium Carbonate, Diatomaceous Earth, Sodium Chloride, Sodium Sesquicarbonate, DL-Methionine, Manganous Oxide, Zinc Sulfate, Ferrous Sulfate, Copper Sulfate, Calcium Iodate, Sodium Selenite, Choline Chloride, Dried Bacillus Licheniformis Fermentation Product, Vitamin D3 Supplement, Niacin Supplement, Vitamin E Supplement, Calcium Pantothenate, Vitamin A Supplement, Riboflavin Supplement, Menadione Nicotinamide Bisulfite, Organic Soybean oil, Pyridoxine Hydrochloride, Thiamine Mononitrate, Vitamin B12 Supplement, Folic Acid, Biotin.

Complete Starter/Grower ORGANIC

The products expressed on this sheet are not reflective of all feed variants and are not endorsed by Cornell University. They are used as examples for educational purposes only.

Supplemental Feeds for Chickens

Supplemental feeds can decrease feed costs, but cannot be the entire diet.

When providing supplemental feeds, always have complete ration available .

What NOT to feed chickens

Moldy or Rotten Food

Dry Beans (Cooked is OK!)

Green/sprouted potatoes, raw potatoes, or potato plant

Tomato plant

Meat scraps

Dairy

What is OK to feed chickens

Extra produce

Overripe vegetables or fruit

Squash or melon seeds and pulp

Vegetable skins

Vegetable plants

Insects

Poultry Production Records

# Number of Birds Purchased	Breed	Chick Arrival Date	From whom Purchased	Butcher Date	# Number of Birds Butchered	Weight After Butcher (lb/kg)
EXAMPLE: 25	Red Ranger	5/15/21	Freedom Ranger Hatcher	8/14/21	23	115 lbs

Problem/Illness/ Death Log:

Date	Number of Birds	Description of Problem	Action(s) Taken
EXAMPLE: 7/1/21	1	Death, heart failure	Disposal of bird

Notes:_____

_____

_____

_____

_____

_____

Poultry Production Records

Feed Records:

Date	Amount of Feed	Type of Feed	Notes
EXAMPLE: 7/1/21	3 bags	Organic Grower Mix	

Labor Hours:

Date	Time Spent	Activity
EXAMPLE: 5/17/21	15 minutes	Feed and water

Date	Time Spent	Activity
EXAMPLE: 5/17/21	15 minutes	Feed and water

2021 Chicken Budget

Name:

Income

		$
Sales 	June	
	July	
	August	
	September	
	October	
	November	

Other Gains

		$
Home Food 		

Expenses

Car and Truck Expenses

		$
Transport 	April	
	May	
	June	
	July	
	August	
	September	
	October	

Rent/Lease

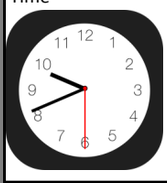
		$
Annual Fee 		

Supplies

Chicks 		
Feed 		
Waterer / Feeder 		
Heat Lamp & Electric 		
Medicine 		
Straw or Wood Chips 		
Packaging 		
Construction Materials 		
Other		

Expenses

Labor

		# Hours
Time 	April	
	May	
	June	
	July	
	August	
	September	
	October	

Food Safety
Before Processing Day

Keep Feeders and Waterers Clean:
Dirty waterers, like the one pictured here, can have bacteria growth which can make a chicken's gut bacteria more harmful to humans. Cleaning them regularly with soap and water or vinegar will help keep the water clean.

Clean Environment:
Keeping the environment clean prevents dirty feathers and decreases the amount of bacteria getting on the carcass from contaminated scalding water. Moving the birds frequently so that they are not in a muddy area will help keep

Clean breast feathers
Some adhering dirt OK

Dirty breast feathers

Remove Food the Night Before:
Giving the birds overnight to digest their food will result in easier removal of the crop and guts. Easier removal means limited breaking of these organs, and less possible contamination.

Remember that they will need water at all times, even when food is removed!

Food Safety
On Processing Day—Checklist

☐ **Processing Area:** The processing area should ideally be a three-sided, roofed structure to reduce dust from blowing in and sun shining on the carcasses. There should be either catch basins for the rinse water or the area should be situated over grass to allow the water to be naturally filtered. A divider should be present to keep the clean and dirty sides separate.

- ☐ **Dirty Side:** Where birds are killed, scalded, and plucked.
- ☐ **Clean Side:** Where birds are gutted, cooled, and packaged.

☐ **Water:** Water used for processing (rinsing, plucking, chilling) should be potable (drinkable). If you have a well, the water should be tested annually. If you have public water, no testing is required. Hoses and nozzles carrying water to the processing area should be cleaned and sanitized.

☐ **Processing Equipment:** All equipment used (tables, cutting boards, holding tanks, chill tanks, buckets, bowls, etc.) must be either hard plastic or stainless steel to allow for cleaning and disinfection.

☐ **Ice:** To cool carcasses and giblets (if keeping) to an internal temperature of 40°F (4.4°C) or less in under 4 hours

☐ **Thermometers:** For checking the temperatures of the ice bath and of the processed poultry.

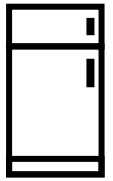
☐ **Food-Safe Cleaners and Sanitizers:** Used to clean and sanitize work surfaces. Surfaces should be thoroughly scrubbed with soapy water, followed by a rinse, and then spraying of the sanitizer and allowed to let dry. This is done both before and following processing. Follow the instructions for use on the label.

☐ **Refrigerator and/or Freezer:** To place the birds in once they have suffieiently cooled. Fresh birds can be kept refrigerated at 40°F (4.4°C) for 4 days, frozen birds can be frozen for about a year.

☐ **People:** Make sure a hand washing station is available and that hands are washed for 10-20 seconds before entering the processing area. Those who are sick should not process poultry. Any cuts on hands and arms should be covered with bandages and with gloves. Those will long hair should pull it back. Clean cloths should be worn. Do not wear jewelry.

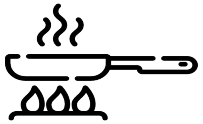
SAFE HANDLING INSTRUCTIONS

THIS PRODUCT WAS PREPARED FROM POULTRY MEAT. SOME FOOD PRODUCTS MAY CONTAIN BACTERIA THAT COULD CAUSE ILLNESS IF THE PRODUCT IS MISHANDLED OR COOKED IMPROPERLY. FOR YOUR PROTECTION FOLLOW THESE SAFE HANDLING INSTRUCTIONS. EXEMPT P.L. 90-492



KEEP REFRIGERATED OR FROZEN.
THAW IN REFRIGERATOR OR MICROWAVE.

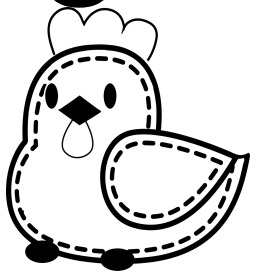
KEEP RAW MEAT AND POULTRY SEPARATE FROM OTHER FOODS. WASH WORKING SURFACES (INCLUDING CUTTING BOARDS), UTENSILS, AND HANDS AFTER TOUCHING RAW MEAT OR POULTRY



COOK THOROUGHLY.

KEEP HOT FOODS HOT.
REFRIGERATE LEFTOVERS IMMEDIATELY OR DISCARD.

Your Local Neighborhood Farm



Locally raised and thoughtfully processed at
123 Street, Anywhere, NY 12345

Product: _____

Packed on: _____ Sell by (fresh): _____ Sell by (frozen): _____

Net Weight: _____ Price per Pound: _____ Total Price: _____

Exempted – P.L. 90-492

Labeling Poultry Requirements for Sale

Required:

- Product name
    - Ex: Whole chicken, whole chicken with giblets, chicken breast, chicken leg quarters, chicken drumsticks, chicken thighs, chicken winds, half chicken
- Inspection Legend
    - “Exempted – P.L. 90-492”
- Net Weight Statement
    - Packed on date
    - Sell by date if fresh (maximum 4 days)
    - Price
        - Per whole bird

          OR
        - Price per pound
            - If this is used must include net weight*
- Address
    - Name and address of the farm
- Handling Statement
    - See figure 1 below.

*To use net weights, you must use a digital scale accepted for commerce that has been annually certified by the Department of Weights and Measures. There is a small fee for them to perform this service. They can be contacted by phone at (518) 457-3146 or by email at AGMWeigh@agriculture.ny.gov

SAFE HANDLING INSTRUCTIONS

THIS PRODUCT WAS PREPARED FROM POULTRY MEAT. SOME FOOD PRODUCTS MAY CONTAIN BACTERIA THAT COULD CAUSE ILLNESS IF THE PRODUCT IS MISHANDLED OR COOKED IMPROPERLY. FOR YOUR PROTECTION FOLLOW THESE SAFE HANDLING INSTRUCTIONS. EXEMPT P.L. 90-492

KEEP REFRIGERATED OR FROZEN.
THAW IN REFRIGERATOR OR MICROWAVE.

KEEP RAW MEAT AND POULTRY SEPARATE FROM OTHER FOODS. WASH WORKING SURFACES (INCLUDING CUTTING BOARDS), UTENSILS, AND HANDS AFTER TOUCHING RAW MEAT OR POULTRY

COOK THOROUGHLY.

KEEP HOT FOODS HOT.
REFRIGERATE LEFTOVERS IMMEDIATELY OR DISCARD.

Figure 1. Safe Handling Instructions for Exempted Poultry

Cost of Production for Current Batch of 25 Broilers

Type of Costs			Fixed Costs	Variable Costs		Cost Per Bird	Cost Per Bird No Labor
			Costs Don't Change Based on Number of Birds, 5 Years with some Salvage Values	Costs increase and decrease based on the number of birds raised		Costs divided by 25	Taking out associated labor costs
Chicken Tractor	Lumber	$ 95.99	$19.20			$0.77	$0.77
	Hardware	$ 33.03	$6.61			$0.26	$0.26
	Labor	$ 104.00	$20.80			$0.83	$0.00
	Netting & Roof	$ 201.38	$40.28			$1.61	$1.61
Chicks	25 chicks	$ 38.75		$38.75		$1.55	$1.55
	Shipping	$ 10.00		$10.00		$0.40	$0.40
Feed and Supplies	Broiler Feed	$178.50		$178.50		$7.14	$7.14
	Daily Chores	$185.25		$185.25		$7.41	$0.00
	Feeder, Waterer, Heat Lamp	$ 38.98	$7.80			$0.31	$0.31
Processing Set-Up	Kill Cone, Knives, Thermometers	$ 185.00	$37.00			$1.48	$1.48
	Scalder	$ 75.00	$15.00			$0.60	$0.60
	Plucker*	$ 500.00	$50.00			$2.00	$2.00
	Propane, Ice	$ 60.00		$60.00		$2.40	$2.40
	Packaging, Labels	$ 25.00		$25.00		$1.00	$1.00
	Freezer*	$ 800.00	$80.00			$3.20	$3.20
	Table*	$ 200.00	$20.00			$0.80	$0.80
	Labor (60 set up, 20 * 25 processing, 60 clean up)	$ 134.33		$134.33		$5.37	$0.00
Total Cost: $928.51			**$296.68**	**$631.83**		**$37.14**	**$23.53**

When calculating out the costs of larger equipment that can be used several times, we use depreciation. This is different than tax depreciation and looks at the purchase/building costs, salvage value (what you can sell it for at the end), and useful life. For this, we used 5 years useful life and 50% salvage on the long term equipment.

Cost of Production for Batches of 75 Three Times a Year for 5 Years
15 Batches Total with 1,125 Broilers

Type of Costs			Fixed Costs - Total to Depreciate	Variable Costs - Per Batch		Cost Per Year	Cost Per Batch	Cost Per Bird	Cost Per Bird No Labor	
			Costs Don't Change Based on Number of Birds, 5 Years with some Salvage Values	Costs increase and decrease based on the number of birds raised		Costs divided by 5 years or multipled by 3 batches	Fixed Costs divided by 15	Costs divided to per bird unit	Taking out associated labor costs	
Chicken Tractor	Lumber	$ 95.99	$95.99			$19.20	$6.40	$0.09	$0.09	
	Hardware	$ 33.03	$33.03			$6.61	$2.20	$0.03	$0.03	
	Labor	$ 104.00	$104.00			$20.80	$6.93	$0.09	$0.00	
	Netting & Roof	$ 201.38	$201.38			$40.28	$13.43	$0.18	$0.18	
Chicks	75 chicks	$ 116.25		$116.25		$348.75	$116.25	$1.55	$1.55	225 chicks per year
	Shipping	$ 30.00		$30.00		$90.00	$30.00	$0.40	$0.40	
Feed and Supplies	Broiler Feed	$535.50		$535.50		$1,606.50	$535.50	$7.14	$7.14	
	Daily Chores	$247.00		$247.00		$741.00	$247.00	$3.29	$0.00	Would add a few minutes each day
	Feeder, Waterer, Heat Lamp	$ 116.94	$292.35			$58.47	$19.49	$0.26	$0.26	Would need to buy two more, replace every two years
Processing Set-Up	Kill Cone, Knives, Thermometers	$ 185.00	$185.00			$37.00	$12.33	$0.16	$0.16	
	Scalder	$ 75.00	$75.00			$15.00	$5.00	$0.07	$0.07	
	Plucker*	$ 500.00	$250.00			$50.00	$16.67	$0.22	$0.22	
	Propane, Ice	$ 100.00		$100.00		$300.00	$100.00	$1.33	$1.33	Would need more ice
	Packaging, Labels	$ 75.00		$75.00		$225.00	$75.00	$1.00	$1.00	
	Freezer*	$ 800.00	$400.00			$80.00	$26.67	$0.36	$0.36	
	Table*	$ 200.00	$100.00			$20.00	$6.67	$0.09	$0.09	
	Labor (30 set up, 10 * 75 processing, 30 clean up)	$ 175.50		$175.50		$526.50	$175.50	$2.34	$0.00	Improve speed
Total Cost: $20,925.50			**$1,736.75**	**$19,188.75**		**$4,185.10**	**$1,395.03**	**$18.60**	**$12.87**	

You'll see that the variable costs increase (75 birds vs. 25) but the fixed costs decrease (more birds to spread it out over a period of time).

Overall, the cost of production per bird is significantly decreased over time!

2021 Chicken Budget

Name:

Income

		$
Sales 	June	
	July	
	August	
	September	
	October	
	November	

Other Gains

		$
Home Food 		

Expenses

Car and Truck Expenses

		$
Transport 	April	
	May	
	June	
	July	
	August	
	September	
	October	

Rent/Lease

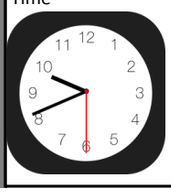
		$
Annual Fee 		

Supplies

Chicks 		
Feed 		
Waterer / Feeder 		
Heat Lamp & Electric 		
Medicine 		
Straw or Wood Chips 		
Packaging 		
Construction Materials 		
Other		

Expenses

Labor

		# Hours
Time 	April	
	May	
	June	
	July	
	August	
	September	
	October	

COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT, LEXINGTON, KY, 40546

ASC-210

Processing Chickens

Tony Pescatore, Steve Skelton, and Jacquie Jacob, Animal and Food Sciences

When processing poultry, remember that you are producing a perishable food product that will eventually be consumed by people. The goal is to produce a safe, nutritious product.

Step 1. Feed withdrawal

Feed should be withheld from chickens prior to slaughter. Proper feed withdrawal will help reduce fecal contamination of the processed carcasses. Take care to match the time off feed with the time the chickens will be processed, factoring in the time between catching and processing the chickens.

Producers will benefit from using the proper feed withdrawal time. Changes in the gut occur when the chicken is off feed, so how long a chicken is without feed is an important issue. Too short a feed removal time will result in feed in the crop and digestive tract, which increases the chance for fecal contamination of the carcass. Too long a time off feed will result in watery digesta and fragile intestines, which can cause problems when processing the chickens.

The ideal time off feed before processing is between 8 and 12 hours. The minimum time off feed is 6 hours. It is worth the extra effort to remove feed at the proper time. The proper time will depend on the type of feed you are using.

Water removal is not as critical as feed removal. In hot weather chickens should be on water as long as possible. Your birds will die if deprived of water for long periods of time.

Step 2. Collection

It is best to catch chickens at night or in the early morning when they are the most calm. For small operations, it is best to catch each chicken individually. For larger operations, however, this method is too time-consuming. Typically the chickens are caught by both legs right above the feet. No more than three chickens should be carried in each hand. Don't let the wings flap too much or the wings may be bruised or broken.

Place chickens in transportation crates. Wooden crates are available, but plastic crates are easier to wash and disinfect. Crates should be cleaned after every use since disease can be transported on the surfaces and spread from one flock to another.

The holding capacity of a crate depends on the size of the birds and the crates as well as the weather conditions that day. A crate will typically hold eight chickens in the summer and ten in the winter.

Step 3. Holding

After the chickens are caught and crated, keep the crates off the ground to prevent contamination from fecal material or water from the slaughterhouse floor. Leave an empty crate on the bottom of a stack to keep chickens off the floor (Figure 1).

When removing the chickens from the crates (Figure 2), handle them with care so that they are not bruised and no bones are broken. The wings are most likely to be bruised or broken with improper handling.

Figure 1. Chickens being held in a crate prior to processing. Note that the bottom crate is empty to keep the chickens off the floor.

Figure 2. Removal from crates

Step 4. Killing

Bleeding cones are commonly used to aid in killing chickens. Most cones are stainless steel and come in a variety of sizes. It is also possible to make your own using plastic traffic cones.

Place the chicken in the cone headfirst with both wings folded together. The cones prevent the chickens from flapping their wings or backing out and escaping. It is important, therefore, that a cone of the correct size is used.

The most humane method of killing chickens is to stun them first so that they are unconscious when their jugular veins are cut. For kosher (Jewish) and halal (Muslim) slaughter, however, the chickens cannot be stunned prior to killing.

In smaller processing plants the chickens are typically stunned using an electrical knife. The knife is placed on the non-feathered part of the head to improve contact (Figure 3). It is important that the person using the stunning knife wear rubber gloves to prevent shocks.

When a chicken is first stunned it will tighten all its muscles. Once the muscles relax the chicken is unconscious. The chicken is not dead at this point, only unconscious, so it is important to kill the chicken as soon as possible after stunning so it does not regain consciousness.

Figure 3. Use of an electrical knife to stun a chicken prior to cutting the jugular veins

The stunning knife should operate at 110 volts. Higher voltages can result in hemorrhages and broken bones. Stunning at this voltage has the added benefit of relaxing the feather follicles, making feather removal easier.

The jugular veins are located on either side of the neck just below the junction of the head and neck (Figure 4). To properly bleed a chicken, one or both of the jugular veins are cut. It will take a few minutes for the chicken to completely bleed out. It is good to have a trap under the cones to collect the blood as it is drained from the chickens. This blood can then be composted along with the feathers and evisceration waste.

It is important that the spinal cord not be cut, as would occur if the head is completely cut off. Severing the spinal cord is said to "set" the feathers, making them harder to remove. The esophagus should also not be cut. If the esophagus is broken or cut, material from the digestive tract may leak out and contaminate the carcass.

Any chicken that dies before it reaches the bleeding cone should be discarded. Improper bleeding of the chicken can result in a cadaver such as the one shown in Figure 5. In such cases the bleeding time was too short, or the jugular veins were not properly cut.

Figure 4. Cutting the jugular vein of a stunned chicken during processing

Figure 5. Blood pooling under the breast skin of a chicken that was dead prior to bleeding

For kosher and halal slaughter, the chickens are not stunned and the jugular and carotid arteries are cut on one side of the head only. This method results in a slower bleed out.

Step 4. Feather removal

Once the chicken has fully bled out, it is removed from the cone and placed in a scald tank. The heat breaks down the proteins holding the feathers in place, making their removal easier. After the water in the tank is heated to the correct temperature, the chicken carcasses are placed on the blades in the tank and rotated through the hot water for a specific period of time (Figure 6).

Scalding is not permitted in kosher processing. As a result, feathers are more difficult to remove.

The scald temperature should be about 140°F. If the scald tank is at the correct temperature it is easy to pull out the wing feathers

Figure 6. Placement of the bled chickens on the blade of the scald tank

(Figure 7). If the temperature is too hot, the carcass becomes partially cooked (Figure 8). If the temperature is too low, the feathers will be difficult to remove when the carcasses are placed in the plucker. Figure 9 compares the result of a scald temperature that is at an adequate level to one where the scald temperature was too low.

Automatic feather pluckers use plastic "fingers" to pull the feathers off the carcass circulating in the equipment. The circulating carcasses will hit each other as well as the walls of the equipment. The pressure that the carcasses are exposed to may result in leakage of any fecal material remaining in the lower intestines, contaminating all the carcasses in the equipment at the time. This is one step, therefore, where the efficiency of the feed withdrawal program can be evaluated. A poor feed withdrawal program will result in increased feather contamination.

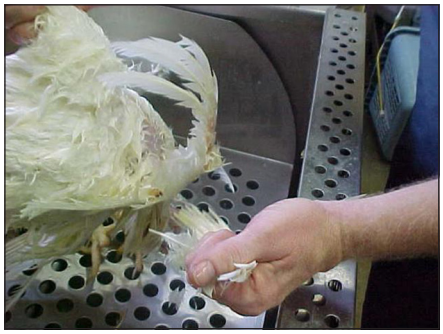


Figure 7. Testing the ease of feather removal post-scald

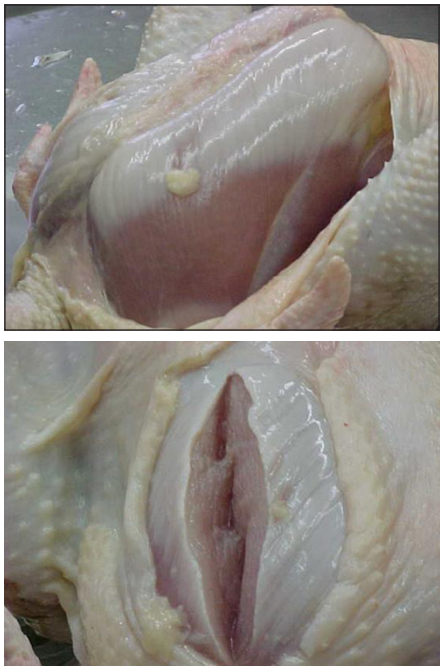


Figure 8. Partially cooked breast meat from a chicken that was scalded at too high a temperature

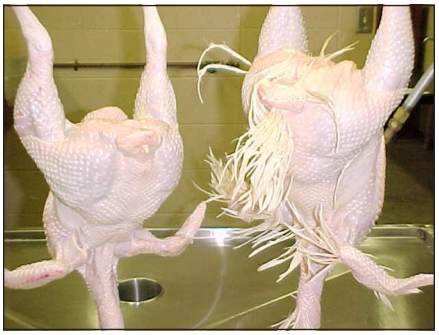


Figure 9. Comparing the effectiveness of feather removal post-plucker of a chicken that has been scalded at the correct temperature (left) with one that was scalded at too low a temperature

Step 5. Removal of preen gland

When the carcass is ready for evisceration, hang it from a shackle by its feet, with the head hanging down. The preen gland is removed as shown in Figure 10. The preen gland is the only oil gland that the chicken has. There are two sacs that, when squeezed by the chicken's beak, release oil for use when preening feathers. The removal of the preen gland is not required for food safety reasons. Instead it is removed to prevent oil on the carcass, which can result in reduced carcass quality. Figure 11 compares the accuracy of oil gland removal for two carcasses. The difference in the appearance between the two carcasses can be easily seen.

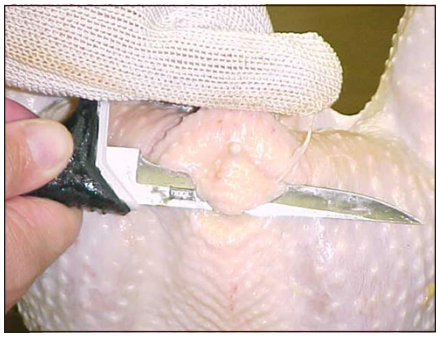


Figure 10. Removal of the preen gland

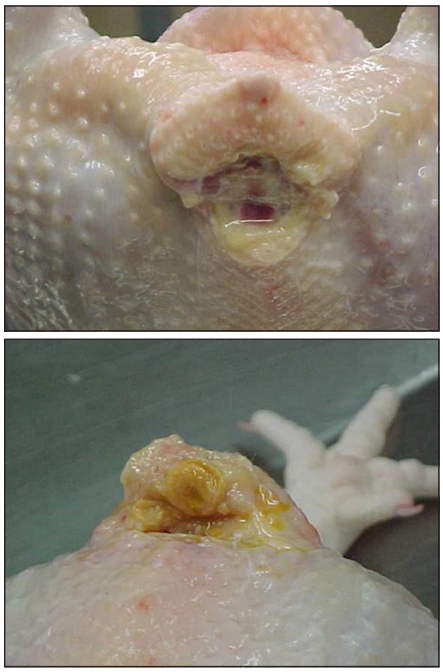


Figure 11. Comparing a carcass with a clean removal of the oil gland (left) and a carcass in which the oil gland has been cut and the contents allowed to contaminate the carcass

Step 6. Removal of the crop

To remove the crop, which should be empty, place the chicken's neck in the palm of your hand. Pull the skin tight and cut through the skin along the back of the neck (Figure 12). Pull the skin of the neck away from the neck itself and isolate the trachea and esophagus (Figure 13). The trachea, which is part of the respiratory system, has rings of cartilage. The esophagus is part of the digestive system and does not have these rings. Follow the esophagus back toward the base of the neck and find the crop (Figure 14). Loosen the crop from the skin. Pull the trachea and crop from the body cavity. Figure 15 shows an example of why the chickens must be off feed for a sufficient amount of time before processing. The carcass in the photo has a full crop. The crop has broken, and the contents are contaminating the carcass.

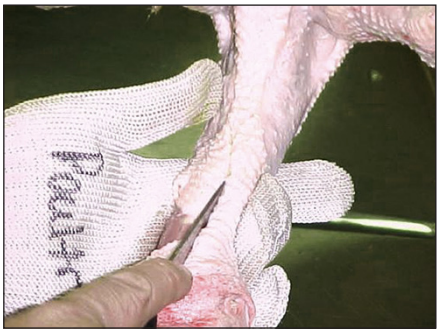


Figure 12. Cutting along the back of the neck

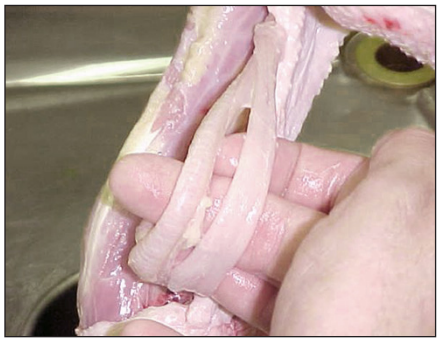


Figure 13. Locating the trachea and esophagus

Figure 14. Locating the crop just outside the body cavity of the chicken

Figure 15. A processed chicken carcass with a full crop

Step 7. Removal of the internal organs

To open the body cavity, cut a hole at the base of the tail above the vent (Figure 16). Reach into the body cavity and hold the large intestines while you continue cutting around the vent (Figure 17). Do not nick the intestines or the carcass could become contaminated as the internal organs are removed. Pull the cloaca and large intestines loose from the body cavity (Figure 18). Enlarge the opening by cutting the skin from the current opening to the keel (Figure 19). It is important that the intestines are not nicked or broken during this step. Figure 20 shows a carcass that had its intestines broken. The result was contamination of the chicken carcass by the fecal material, which is a food safety concern.

Place the chicken's head and neck into the shackles to allow easy removal of the internal organs (Figure 21). Reach into the body cavity and pull out the internal organs (Figure 22).

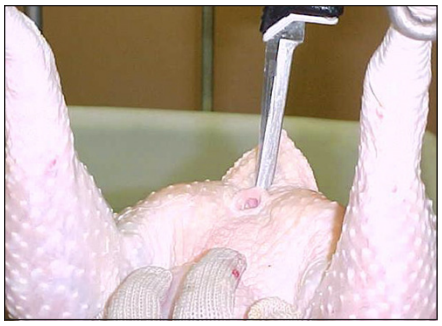


Figure 16. Cut a hole at the base of the tail above the vent.

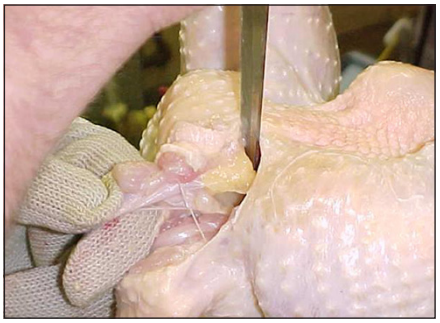


Figure 17. Hold the large intestines while continuing to cut around the vent.

Figure 18. Pull the cloaca and large intestines loose from the body cavity.

Figure 19. Enlarge the abdominal opening by cutting the skin from the opening to the tip of the keel.

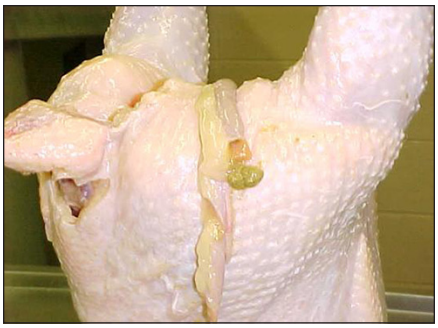


Figure 20. Carcass with fecal contamination from broken intestine

Figure 21. Place the chicken's head and neck into the shackle.

Figure 22. Reach in the body cavity and remove the internal organs.

Step 8. Inspection of the internal organs

Inspect the internal organs for any sign of disease or abnormality (Figure 23). Similarly, once the entire intestinal tract has been removed it should be evaluated for disease or abnormality. In order to be able to identify disease or abnormality in the internal organs it is important to be familiar with the normal appearance of these organs in a healthy chicken. Figures 24, 25 and 26 show organs and intestines from a healthy broiler chicken. The liver is mahogany to light tan in color. The membranes are clear, and there are no hemorrhages. The gall bladder is intact. It is enlarged because the chicken was not eating prior to slaughter and thus did not have a need for bile, which is stored in the gall bladder. The color of the spleen is similar to that of the liver. The membrane around it is clear, and there are no hemorrhages. The intestines are intact. The connective membranes are clear, and there are no hemorrhages.

After inspection, completely remove the organs. The heart, gizzard and liver can be saved for consumption. The gizzard should be cut open and the inner membrane peeled off and discarded. The spleen and gall bladder are separated from the liver and discarded. Handle carefully so that the bile is not released from the gall bladder since it will stain the liver.

Figure 23. Inspect the intestines and organs for any sign of disease or abnormality.

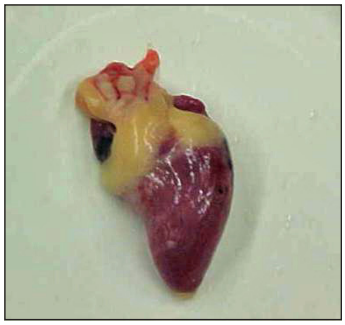


Figure 24. Normal heart (top) and gizzard from a healthy chicken

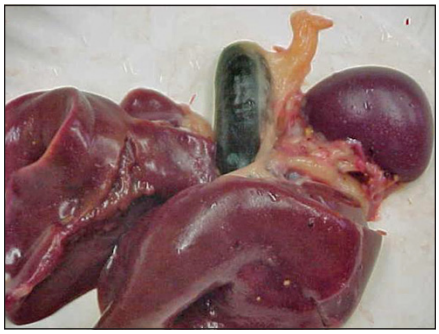


Figure 25. Normal liver, gall bladder and spleen of a healthy chicken

Figure 26. Normal intestines of a healthy chicken

Using a lung remover, remove the lungs from the inside of the carcass (Figure 27). The lungs should be bright pink in color and have no lumps (Figure 28). The lungs are discarded.

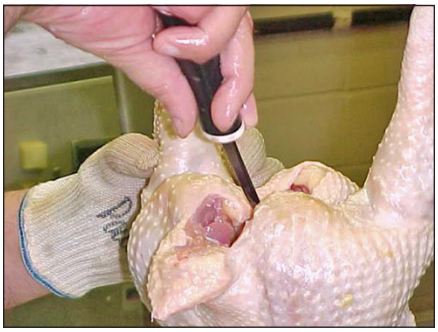


Figure 27. Removing the lungs from the body cavity

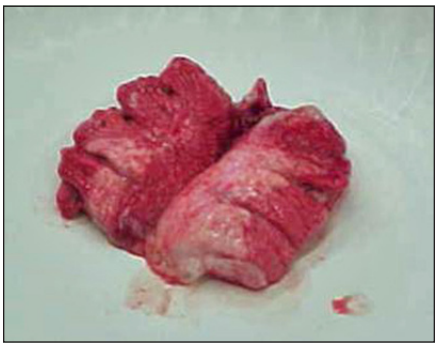


Figure 28. Lung from a healthy chicken

Step 10. Removal of the neck and legs

The next step is to remove the neck (Figure 29) and feet (Figure 30). The neck is typically cut off while the carcass is still in the shackles. Remove the carcass from the shackle and cut off the feet at the hock joint. The neck can be kept as an edible part. When a commercially produced whole chicken is sold with giblets, it has the neck, heart, gizzard and liver in the body cavity. Some people also consume chicken feet. They are cleaned and the outer skin removed. They are often used to make chicken soup.

Figure 29. Removing the neck

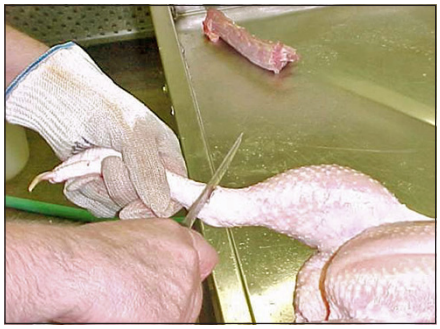


Figure 30. Removing the feet

Step 11. Finish

Do a final rinse and inspection of the carcass. Remove any bruises, such as the bruised wing shown in Figure 31 and the bruised muscle meat shown in Figure 32.

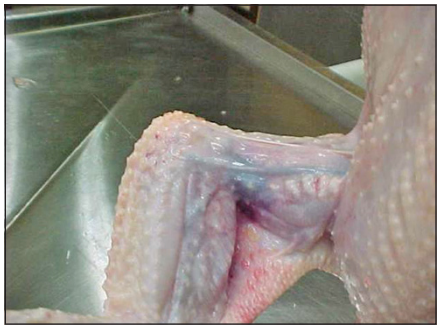


Figure 31. Bruised wing

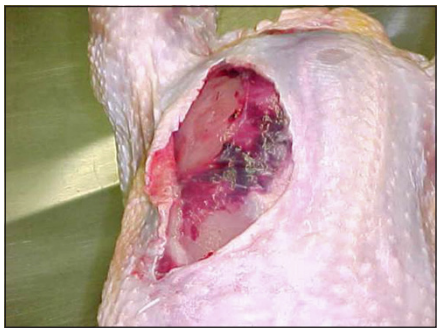


Figure 32. Bruised breast muscle

Step 12. Reduction of the temperature of the carcass

After the carcass has been rinsed, inspected and any bruises removed, place it in a chill tank containing water and ice (Figure 33). The purpose of the chill tank is to get the temperature of the product to 40°F or lower. When the correct temperature is reached (in less than 4 hours) the product is removed, drained and packaged.

Figure 33. Processed chicken carcass in chill tank

Trouble-shooting

Occasionally things go wrong. It is important to identify the source of the problem and adjust the processing method accordingly.

- The carcass shown in Figure 5 is an example of an incomplete bleed. The chicken was not properly bled (too short a bleed time) or the jugular veins were not properly cut. An adjustment in the slaughter technique is required.
- The bruised wing shown in Figure 31 is due to rough handling of the chicken while it was being caught, placed in the crate or removed from the crate. Careful handling of live birds will help prevent this problem.

- Similarly, deep muscle bruising as shown in Figure 32 is the result of rough handling of the live chickens. Careful handling of the chickens at the farm and at the time of load out will prevent this type of damage.
- A very torn carcass such as the one shown in Figure 34 may be the result of a broken picker finger in the plucker. In addition, excessively fat carcasses tear easily. The intestines of the carcass shown have ruptured, contaminating the carcass. As a result, the carcass is not salvageable. In contrast, the carcass in Figure 35 has torn skin, but there is no damage to the intestines. While the appearance of the carcass is negatively affected, there is no food safety reason to discard the carcass. It can be salvaged with corrective action.

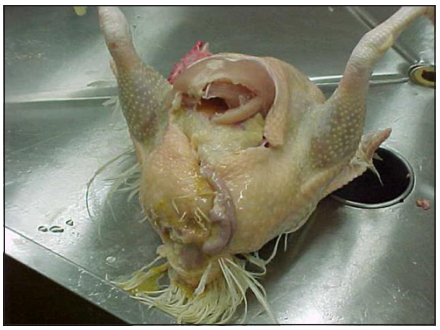


Figure 34. Carcass contaminated by torn intestines

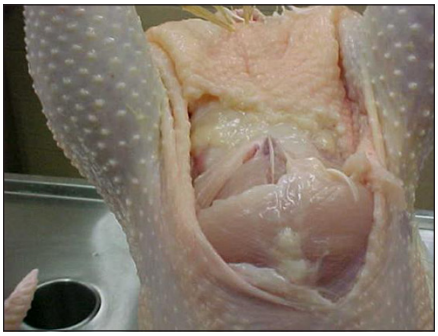


Figure 35. Torn carcass with no damage to the intestines

- A tearing of the intestines can result in leakage onto the carcass, as shown in Figure 20. Causes include improper cutting of the opening around the vent or a feed withdrawal time greater than 14 hours, which can result in fragile, easily torn intestines. Such carcasses need to be washed and chilled separately from other carcasses.
- The carcass shown in Figure 36A has a small body scratch, indicated at the point of the knife. The scratch was most likely made by the toenail of another chicken. A possible cause for scratches is overcrowding or inadequate feeder space. As shown in Figure 36B, the flesh under the skin is necrotic, making it unfit to eat. The carcass can be salvaged, however, if this tissue is removed. As shown in Figure 36C, the amount of flesh that needs to be removed is far greater than the original scratch would indicate.

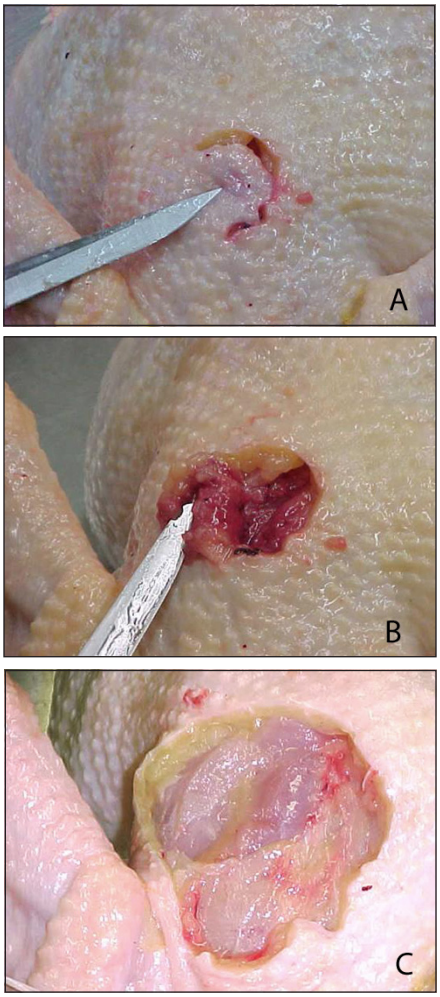


Figure 36. Impact of a small scratch on the quality of the underlying meat

Issued 10-2013

Processing Record Sheet

Providence Farm Collective

Person completing this form:_____

Flock Name: _____

Community Owner: _____

Processing Date: _____

Number of Birds in Flock: _____

Number of Birds Processed: _____

Number of Saleable Birds: _____

Temperature Records

Temperatures of ice baths and scalding water will be checked prior to processing and after every 25 birds at minimum. Ice bath temperatures will be checked hourly until the internal temperature of carcasses reaches 40°F (4.4°C). Note at what hour of chilling carcasses are removed from ice bath and packed.

Scalding Water Temperature (Goal - 145°F (63°C) - 150°F (66°C))

	Complete (X)	Initials	Corrective Actions (if any)
Pre-Processing Temperature Check			
Check after 12 birds			
Check after 25 birds			
Check after 50 birds			
Check after 75 birds			

Additional Checks - share when, why: _____

_____

Ice Bath Temperature (Goal - less than or equal to 40°F (4.4°C))

	Complete (X)	Initials	Corrective Actions (if any)
Pre-Processing Temperature Check			
Check after 12 birds			
Check after 25 birds			
Check after 50 birds			
Check after 75 birds			
1 hour after processing			
2 hours after processing			
3 hours after processing			
4 hours after processing			

Additional Checks - share when, why: _____

_____

Cleaning and Disinfection Checklist

Pre Processing

Task	Complete (X)	Initials
Processing area set up with clean and dirty sides		
Hoses pre-washed, rinsed, and sanitized		
Tables pre-washed, rinsed, and sanitized		
Kill cones and knives pre-washed, rinsed, and sanitized		
Scalder pre-washed, rinsed, and sanitized		
Plucker pre-washed, rinsed, and sanitized		
Ice bath containers pre-washed, rinsed, and sanitized		
All processors have washed hands		
Ice baths are filled and maintaing temperature of 40°F (4.4°C)		

Post Processing

Task	Complete (X)	Initials
Tables washed, rinsed, and sanitized		
Kill cones and knives washed, rinsed, and sanitized		
Scalder washed, rinsed, and sanitized		
Plucker washed, rinsed, and sanitized		
Ice bath containers washed, rinsed, and sanitized		
Ice baths washed, rinsed, and sanitized		
Hoses washed, rinsed, and sanitized		
All offal, blood, and feathers are composted or buried		
All processors have washed hands		
Storage for carcasses maintained at max temp of 40°F (4.4°C)		

- At least 2 very sharp quality straight edge knives (more if you want the capacity for multiple people to work at once),
    - https://www.strombergschickens.com/product/boning-multipurpose-knife
    - There should be dedicated killing knives and gutting/boning knives to keep the killing knives super sharp.
- Sharpening Steel
    - To constantly rehone knives.
- Sharpening Block
    - Less important for this first batch. As the knives are used more and more, they'll need to be resharpened.
- Large stock pot
    - To heat scalding water and later to heat shrink wrap packaging water
- Outdoor propane burner
    - To heat stock pot water to scald birds.
- Heat Safe Gloves
    - To allow for the safe dunking of birds in scalding water. Elbow length preferred
- Shackles
    - To hang birds to be plucked
        - https://www.premier1supplies.com/p/plastic-shackle
    - Can use cord with a slip knot, too
    - Can do this on table, but warning: it'll be messy! It's easier to pluck when the bird is handing.
- Two plastic or stainless steel tables
    - One for the "clean" processing side, one for the "dirty" processing side.
- Three sided structure for processing.
    - This can be a barn. This can be a pop-up tent with sides. The big thing is that there needs to be two separate areas – one for the side where the birds are killed and plucked, and one for the area where the birds are gutted, cooled and packaged. This is not important for home use but is crucial for retail.
- 5 gallon buckets
    - To catch blood, guts and waste water (unless waste water can flow directly into a treatment/septic system)
    - I also forgot to mention that if you are in a grassy field that the water (only "clean" waste water) can run onto the field.
- 1-2 restraining cones
    - The number purchased depends on how many you want to kill at once. These are to hold the birds for a clean kill and bleed out. You can use traffic cones and milk jugs with a hole cut in the top and bottom too. By keeping the birds restrained, it's also less traumatic and reduces meat bruising and leg/wing disjointing from flapping so much. I would say that they're necessary unless you have another restraining/killing method in mind.
    - https://www.amazon.com/gp/product/B009S9EZ3M/ref=ppx_yo_dt_b_search_asin_title?ie=UTF8&psc=1
- 2 Large food-safe vessels (can be stainless or food safe plastic barrels with the tops removed, even)
    - For chilling birds.
- Thermometers
    - For scalding water and chill water

- Ice
    - 3-5 pounds per bird processed
- Hose
    - With dedicated spray head for processing connected to a potable water source
- Shrink wrap bags
    - For finished birds – also called “broiler bags”. This is for retail sales. Ziploc bags are fine for home use. If you want to sell this batch of birds at all, then you’ll have to use broiler bags.
        - https://www.strombergschickens.com/product/heat-shrink-bags-broiler-size.
- Zip Ties
    - To secure shrink wrap bags
- Labels
    - Both your farm’s label and the Safe Handling Instructions label
        - https://www.walmart.com/ip/Avery-TrueBlock-Shipping-Labels-Sure-Feed-Technology-Permanent-Adhesive-2-x-4-250-Labels-6427/138860356
- Towels
    - For wiping off bagged birds following shrink wrapping.
- Food-Safe bactericidal sanitizer
    - This can be dawn dish soap and hot water for the stainless steel and chlorine for any plastic. To be extra safe, you can spray things down in a 50/50 5% white vinegar/water solution as a sanitizer once they are washed and rinsed to kill any residual bacteria.
- Bucket
    - Food safe- for washing tables and equipment.
- Scrub brush or scrub pad
    - Food safe – for washing tables and equipment.
- Coarse wood chips (arborist chips)
    - For composting – need somewhere around 6 yards. Otherwise, the waste can be buried.
- Compost thermometer
    - https://www.amazon.com/gp/product/B002P5RGMI/ref=ppx_yo_dt_b_search_asin_title?ie=UTF8&psc=1

Oysters on Straw

Pleurotus species

Information from:
https://www.fieldforest.net/product/oysters-on-straw-instruction-sheet/instruction-sheets



Please note: Kira™, Blue Dolphin™ and Polar White™ Oyster spawn are log specific strains, and are not recommended in substrate applications.

Growing Oyster mushrooms on pasteurized straw can be one of the most rewarding production ventures for mushroom growers. With the current emphasis on local foods and local farm markets there is hardly another crop that is so well suited. Oyster mushrooms have a relatively short shelf life and are a bit fragile, so they are best hand carried and sold within a week. When fresh, they are some of the most stunning and colorful produce available, perfect for the market gardener.

Oyster mushrooms can grow on a variety of things including wood logs, cottonseed hulls, corn cobs or office paper, but in North America, cereal straws are the substrate of choice (wheat and oat straw do particularly well). Equipment is fairly simple and outstanding results are obtained relatively quickly. It can be fraught with its own problems as scale-up commences, however, so be prepared to research and proceed carefully as you prepare to increase production.

Straw must be moisturized to host the growth of the mushroom mycelium and treated with hydrated lime or heat. Wood logs do not need such treatment as they are already moist and have a protective sleeve (the bark) slowing moisture loss and providing a semi-sterile environment. In addition, living green trees cut for Oyster cultivation have an active immune system that holds back contaminants.

The Basic Steps for Growing Oysters on Straw

1. Prepare the substrate
Straw must be moisturized to promote the growth of the mushroom mycelium and treated with heat or hydrated lime. Whenever possible, chop the straw into 3-5 inch pieces with a chopper, lawn mower or string trimmer in a garbage can. Heat pasteurization will kill off most organisms that compete directly with the Oyster mushroom mycelium, and will kill any of the cereal grains present in the straw. Chopped straw should be put into pillow cases, grain sacks, or any similar water penetrating bags. Secure the bags with zip ties or string. Heat a large pot of water to 160°F. Submerge the bags of straw completely in the

water, weighing down with bricks or similar objects. Cook the bags for 45-60 minutes, all the while monitoring the temperature (compost thermometers work great for this). Ideally, the cooking temperature should remain around 165°F. Five degrees up or down is fine. When complete, drain the standing water, and cool for about 20 hours or until the internal temperature of the straw is below 75°F.

The Cold Soak Method can be used as an alternative to heat pasteurization. Hydrated Lime (also known horticultural hydrated lime) is a powder made by treating lime with heat and pressure. It is available at garden centers (we use Hi-Yield brand). When added to cold water at a rate of about ⅛ cup (12g) per gallon of water, this soaking solution will make the straw a suitable substrate for Oyster mycelial growth. At this rate, the pH level should be up around 12, which is ideal. It is a good idea to invest in pH strips (litmus paper) to assure you are achieving this level. Adjust the given rate as needed. Add the powder to the soak water, then add the straw. Soak for 18-20 hours, and drain for several hours until the moisture content is around 65%. The squeeze test can be used to estimate moisture content. Simply grab a handful of straw and squeeze as hard as you can. No more than one drop of water should come out.

2. Inoculate

Once prepared, the straw can be inoculated (planted). This process should happen indoors in a clean area with minimal traffic. Use 5-10% of the wet weight of the straw in grain or sawdust spawn: a 20 lb. bag of wet straw would need 1 lb. of grain when inoculated at 5%. A 4 lb. bag of our grain spawn will inoculate roughly ⅔ of a small square straw bale when using a 5% rate (filling about 3 or 4 of our 18 x 36 inch Oyster bags). The straw should be emptied from the soaking bag into a large sterilized container; a stainless steel tub sink that has been disinfected works well. Evenly mix in the proper amount of grain spawn with rubber gloves or clean hands. Tightly and as compact as possible, stuff the straw/spawn mix into polyethylene sleeves, buckets or any other suitable container, seal (with zip ties, string, tape etc.) or cap, and label. Alternately, straw and spawn can be layered within sleeves/buckets, skipping the need for mixing first in a sterilized container. If reusing buckets, be sure to clean thoroughly between uses. Holes for circulation and eventual growth should be put in immediately after planting (an arrow broadhead attached to the end of a wooden handle works great for poking perfectly sized holes in poly sleeves). Using a diamond pattern, punch holes about 4-6 inches apart from one another (see diagram to right).

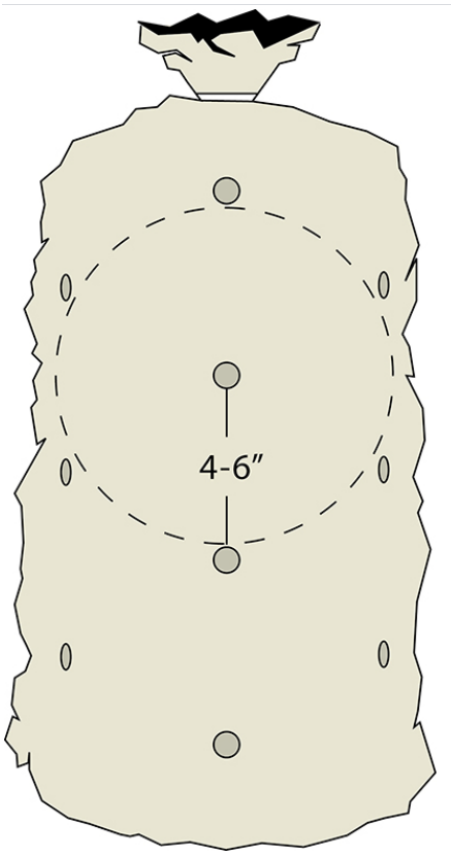
3. Incubate

Place filled sleeves/buckets into incubation. Ideally, the room used for this should be somewhere between 75-77°F with a humidity of 80%. During this period, it is extremely important to monitor internal bag temperatures. These temperatures usually peak after 3-5 days of inoculation, and should not exceed 90°F. Spawn death occurs at 100°F. If temperatures become too high increase air flow, decrease room temperature, or relocate your bags/buckets. Bags/buckets should stay in incubation until pinning occurs, usually within 3-5 weeks.

4. Fruiting and harvesting

Once pinning is visible, the bags/buckets are ready to move into a fruiting room. This room should be cooler in temperature, 65°F is optimal. Humidity should be increased to 85-90%. Make sure the bags/buckets receive plenty of light. Generally, 10-12 hours of natural, incandescent or fluorescent is optimal. However, if growing Golden Oysters, it is important that the light be 600 lux: 2× the intensity of normal lighting. The bags/buckets will fruit many times and can last several months. As the number of fruitings increase, yield and quality will decrease.

Difficulty:	Moderate.
Time to plant:	Year round indoors.
Time to fruiting:	2-4 weeks (depending on strain).
When they fruit:	Year round indoors.
Grow on:	Straw, cotton seed hull, and other agricultural by-products.
Amount of straw:	One small square straw bale will require approximately 6-8 lbs. of spawn.
Appearance:	Broad color range of white to brown, grey to blue, yellow and pink. Flat thin cap with gills running down an eccentric stem.
Flavor and texture:	Tender, with a mild seafood-like flavor.



Mushroom Production Pitfalls

This list contains some things that can go wrong when producing oyster mushrooms indoors on straw and how to prevent/correct them.

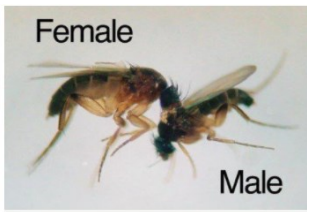


Figure 1. M. halterata female (left), male (right) (Photo by Stefanos Andreadis)

Figure 4. M. halterata larva (Photo by Stefanos Andreadis)

Fungus Gnats and Flies

Problem: The larvae consume mycelia and caps, resulting in decreased production and wilted, worm-ridden product.

Solution: Clean and sanitize growth chamber and fruiting chambers in-between each batch of mushrooms to remove adult flies, eggs, and larvae. Compost the spent blocks. Can use sticky traps to catch adults. Properly pasteurizing the substrate makes sure you start with clean media.

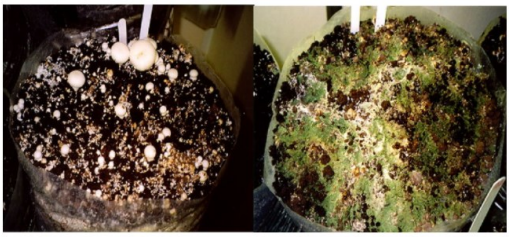


Figure 1. The bag on the left shows casing with healthy spawn growth, while the bag on the right shows the effects of green mold caused by *Trichoderma harzianum* biotype 4 (Th4).

Photos from Penn State University

Green Mold (Trichoderma)

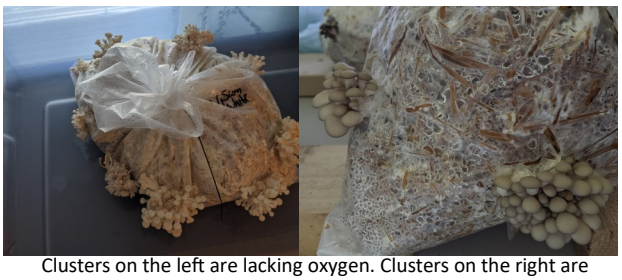
Problem: Contaminated bags spread mold spores easily. Results in reduced yields.

Solution: Remove any contaminated bags that you see. A full cleaning and disinfection of the growing and/or fruiting chambers may be needed. Make sure that your straw pasteurization process is effective.

Not Enough Humidity

Problem: Mushrooms need at least 80% humidity to fruit. Lower humidity can cause stunting, lack of fruiting, drying of media, or drying around the mature mushroom edges.

Solution: Install a hygrometer to measure humidity and make sure that it's above 80%. Cutting fewer holes in the grow bags can help retain some humidity. If possible, installing a humidifier in the growing and fruiting chambers can help, keeping in mind to keep the humidity below 100%.



Clusters on the left are lacking oxygen. Clusters on the right are grown under ideal conditions.

Not Enough Oxygen

Problem: Mushrooms need good air exchange to fruit. Limiting that will result in elongated, weak, stringy looking mushrooms and reduced yields.

Solution: Increase the air flow in the fruiting chamber.

Overmature

Problem: Mushrooms only take 3-7 days to fully fruit, and this varies depending on temperature, strength of the mycelium, and humidity. Overmature oyster mushrooms have wavy edges, will have deposited spores, and are tough and low quality.

Solution: Check mushrooms twice daily in the fruiting phase and harvest when caps are fully spread out, but the edges are still round.

Designing a Grow Room
Considering Your Conditions for Mushroom Production

Questions compiled by Steve Gabriel, Cornell Specialty Mushrooms and Agroforestry Specialist

Incubation Needs:

- Where will you incubate?

- How will you maintain temperature? (55 - 75F, ideally stable)

- How will you promote good air flow?

- How much space will you need?

Fruiting:

- How much space do you need?

- Where will your grow room be located? Current conditions?

- What will you build your grow room out of? What are your estimated costs?

- How will you monitor and maintain temperature?

- How will you monitor and maintain humidity?

- How will you monitor and maintain Co2?

- How will you monitor and maintain light?

THE FRUITING ENVIRONMENT: CHOSING A GROW ROOM DESIGN FOR HOME CULTIVATION

WRITTEN BY TONY SHIELDS AT FRESH CAP MUSHROOMS
https://learn.freshcap.com/growing/the-fruiting-environment-chosing-a-grow-room-design-for-home-cultivation/

CONTENTS

One of the most important aspects of growing mushrooms indoors is providing the right fruiting environment. Unless you have adequate temperature, humidity and air exchange, your mushroom block will dry up and not produce any fruit.

Providing adequate air exchange while maintaining high humidity is difficult to master, but there are several possible solutions that will get the job done.

Although different mushrooms have their own unique environmental requirements, once you have a basic grow area set up you can tailor it to the specific species you are trying to grow.

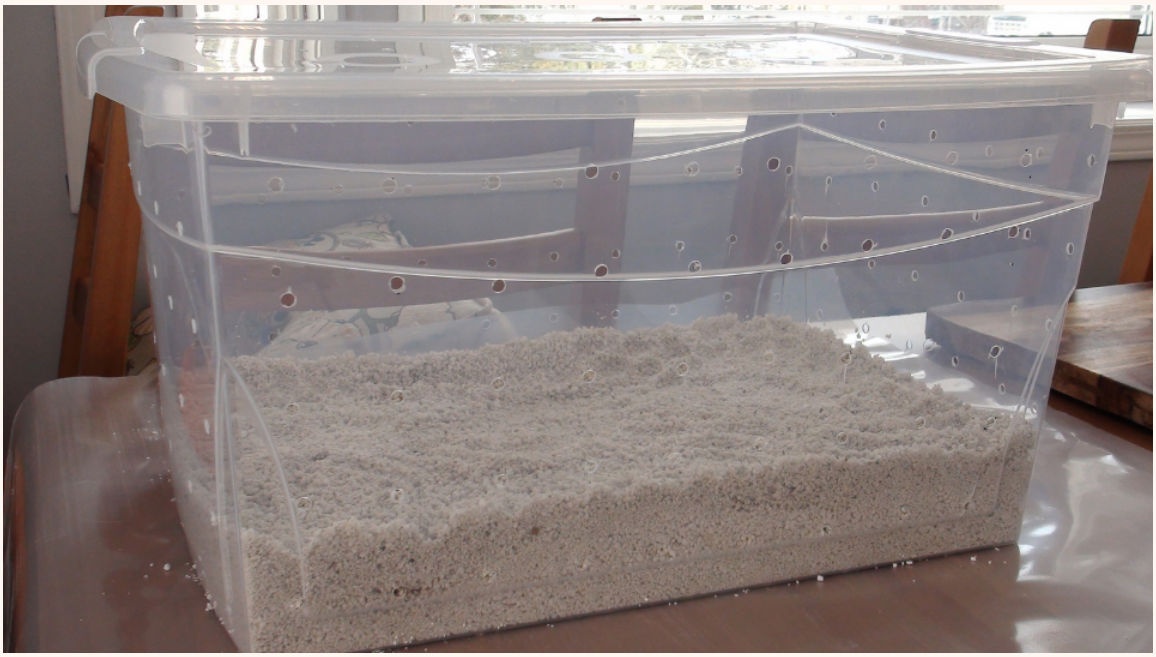
Straw logs hanging in the grow room.

When trying to design a grow area, think what causes mushrooms to fruit in nature- that is, high humidity and cool temperatures. That is why you see way more mushrooms outside in the fall when the rain is falling and cooler temperatures have settled in.

Two other aspect that are not as obvious is the requirement for a high rate of air exchange, or more specifically low levels of carbon dioxide, and the proper light levels. Most mushrooms don't grow well in the dark and require a threshold level of light to produce normal fruits.

As for air, high levels of fresh air can be difficult to achieve when trying to maintain high humidity, and some experimenting will be required on the part of the home cultivator.

THE CHEAPEST OPTION: THE SHOTGUN FRUITING CHAMBER



Anyone just getting into the hobby might want to start with a shotgun fruiting camber. It is essentially a clear plastic tote that looks as if it was blasted with a shotgun, hence the name. This design is good for the small scale cultivator who just wants to fruit one or two small blocks, or a few PF cakes.

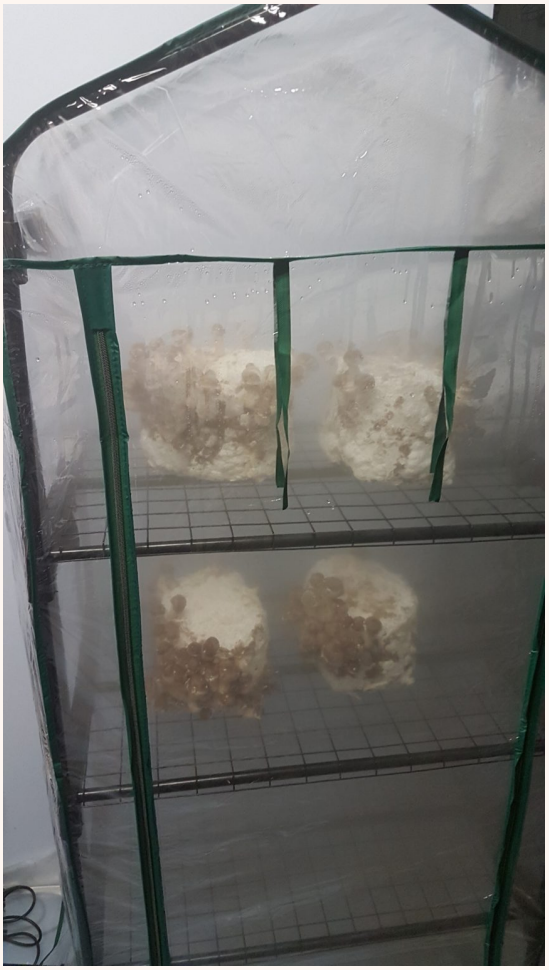
A good fruiting environment can be maintained in a SGFC, but it requires a little more monitoring and maintenance.

Start by getting a clear plastic tote that is big enough for whatever blocks you want to fruit. Drill holes in the tote two inches apart on all sides of the tote. This will allow the fruiting blocks or PF cakes to breath.

In order to produce and maintain humidity, fill the bottom of your SGFC with a few inches of perlite. Perlite is a porous rock like material that absorbs water. This water is slowly released inside your chamber which causes a humid environment. Before putting the perlite in your chamber, soak it in water for an hour so it can fill with water.

The last thing you will need for your SGFC is a spray bottle with a fine mist. Several times a day you will want to open the lid and fan to get some fresh air movement, and then spray water into the chamber. This should help to maintain high humidity. If you want to know where you are at, get a cheap **hygrometer** to monitor the humidity levels. It will also tell you the temperature. Keep your SGFC by a window or in room that receives a moderate level of natural diffuse light.

THE DEDICATED HOBBYIST OPTION: MUSHROOM GREENHOUSE DESIGN



If you want to pump out a lot of mushrooms and want to be able to automate some of the process, you might consider stepping up to a mid size grow chamber. The most common type of indoor mushroom growing chamber is the 4 tier green house. This option will cost a little more, but is a great way to increase you mushroom growing potential.

The 4 tier greenhouse is typically used for starting plants indoors. They are very commonly found in garden centers, big box retailers or can be bought online for pretty cheap. You can even buy entire kits online- which saves picking up all the components individually. The **4 tier greenhouse** can easily be converted into a mushroom growing paradise. It is big enough to hold several blocks, flat trays and lots PF cakes.

The main advantage of this design is the incorporation of the **humidifier**– which can be automated- and saves you from having to open the flaps and spray several times a day. You could just place the humidifier inside the grow chamber, and although that will easily maintain high humidity, you will still have to open the chamber several times a day to allow for fresh air exchange. A much better option is to pipe in the humidifier using a few pieces of PVC pipe.

The humidifier has a fan, which will push fresh humid air into your chamber.

When **choosing a humidifier**, you have the option of either a cool mist or a ultrasonic humidifier. Both will work, but the ultrasonic is a far better option. Ultrasonic humidifiers produce a visible stream of vapor, using spinning discs that vaporize water droplets, and can increase the humidity in your chamber really quick.

Cool mist humidifiers simply use a wick to draw water up and into an air stream and are much less effective. Make sure to clean your humidifier often to prevent contaminants from building up inside.

It is best to use a hygrometer in your grow chamber to monitor the humidity. You will not want to run the humidifier all the time, as it will produce way too much moisture in your grow area. Typically, you will want to maintain at least 80% relative humidity. A good option is to get a timer that has multiple on and off setting, and playing around with your specific set up until you find a good on-off pattern.

If your grow chamber is placed on carpet or hardwood, make sure you place a sheet of plastic underneath so that the build up of moisture doesn't damage your floors. Also, although the humidifier will pump in fresh air, it is not always enough, especially for air hungry species like blue oyster. You may still have to open up your chamber once in a while to fan in some fresh air.

The trick to a successful 4-tier grow tent is trial and error in order to figure out what set up works best for your specific area, season and type of mushroom.

Here are some things you might need. In particular, we have used the tear drop humidifier with mush success.

SEE WHAT WORKS FOR YOU!

Mushrooms require a specific balance of humidity, temperature, fresh air and light. The above options are good choices for the home cultivator, but you can get creative and come up with a design that works for your situation. Part of the fun of growing mushrooms at home is the experimentation. Post pictures of your set up below!

Thanks for reading and good luck with your grows!

Youtube video- building a fruiting room inside your house: https://www.youtube.com/watch?v=2G9AZBA4f48

Mushroom Workshop Needs list. Assuming 20 participants making 2 bags each with some extra budgeted in.

- Nitrile gloves - $22.68/100
    - https://www.lowes.com/pd/The-Safety-Zone-100-Count-One-Size-Fits-All-Nitrile-Cleaning-Glove/3578134
- pH Strips – $7.59
    - https://www.amazon.com/Jovitec-Universal-Paper-Strips-Measure/dp/B079K71HJM/ref=pd_bxgy_img_3/138-1391201-7221321?_encoding=UTF8&pd_rd_i=B079K71HJM&pd_rd_r=48f295cd-8d89-4bb6-80ca-b630b9fcff3c&pd_rd_w=djoo0&pd_rd_wg=pPPCl&pf_rd_p=f325d01c-4658-4593-be83-3e12ca663f0e&pf_rd_r=WETNF3NFYV4BHYWT12M7&psc=1&refRID=WETNF3NFYV4BHYWT12M7
- Hydrated Lime- Hi-Yield Brand- (treats 174 gallons of treated water)- $18.82
    - https://www.walmart.com/ip/Hi-Yield-33371-Horticultural-Hydrated-Lime-5-Lbs/46078042
- 2 - 55 gallon food-grade drums - $15 - $30 each
    - You can also use one drum and fill it all the way to the top vs my proposal of filling it halfway, but it may be hard to drain.
- Ziploc Freezer bags – Gallon – 60 bags
    - https://www.walmart.com/ip/Ziploc-Brand-Freezer-Gallon-Bags-with-Grip-n-Seal-Technology-60-Count/281042661?selected=true
- Chopped straw - $5 per bale equivalent – Craigslist – need 3 bales, or enough to fill 2 55-gallon drums - $15
- Screen to drain (make your own – 2'x4' box covered in mesh – keep off ground). Can also use the vegetable cleaning table if washed really well.
    - 2"x4"x8' – need 4 for 2 drain trays - $5.28 each – $21.12
        - https://www.lowes.com/pd/Top-Choice-2-in-x-4-in-x-8-ft-Douglas-Fir-Lumber-Common-1-562-in-x-3-562-in-x-8-ft-Actual/1000009810
    - ¼" hardware cloth – need 1 (enough for 2 drain trays) - $15.38
        - https://www.lowes.com/pd/Blue-Hawk-Actual-10-ft-x-2-ft-Galvanized-Steel-Welded-Wire-Garden-Hardware-Cloth-Rolled-Fencing/1000367329
    - Staples – $4.48
        - https://www.lowes.com/pd/Grip-Rite-3-4-in-Leg-x-1-4-in-Round-Crown-Standard-Staples-1-lb/3043059
- Oyster Spawn – 3 bags – $21/each - $63
        - https://www.fieldforest.net/category/oyster-grain-spawn
        - Grey Dove
            - https://www.fieldforest.net/product/Oyster-Grey-Dove-Pleurotus-ostreatus-Grain-Spawn/oyster-grain-spawn
        - PoHu
            - https://www.fieldforest.net/product/Oyster-PoHu-Pleurotus-ostreatus-Grain-Spawn/oyster-grain-spawn
        - Summer White
            - https://www.fieldforest.net/product/Oyster-Summer-White-Pleurotus-ostreatus-Grain-Spawn/oyster-grain-spawn
        - Shipping on spawn - $17

Supplier Directory

We do not endorse or recommend any particular spawn producer but rather provide this reference of suppliers in alphabetical order.

Like with a seed company, it is recommended that you check out a supplier and ask good questions before making a decision.

Created by Steve Gabriel, Cornell Specialty Mushrooms and Agroforestry Specialist

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Amycel (USA)

http://amycel.com/

Oyster Spawn

Field and Forest Products (Wisconsin)

fieldandforest@centurytel.net
http://www.fieldforest.net

(800) 792-6220
(715) 582-4997

N3296 Kozuzek Road
Peshtigo, WI 5415

Fungi Ally (Massachusetts)

http://fungially.com/
fungially@gmail.com

978-844-1811

Fungi Akuafo (Alberta)

www.fungiakuafo.com
info@fungiakuafo.com
Meghan Vesey and Tara Stephens
Site 7, Box 16, RR2
Sundre, Alberta, Canada
T0M 1X0
(403) 638-2007

Fungi Perfecti (Washington)

http://www.fungi.com/
info@fungi.com

Order Line: 800-780-9126
Phone: 360-426-9292

PO Box 7634
Olympia, WA 98507
USA

Lambert (Pennsylvania)

https://www.lambertspawn.com

Mushroom People (Tennessee)

http://www.mushroompeople.com/
mushroom@thefarm.org

(931) 964-4400

560 Farm Road
P.O. Box 220
Summertown, TN 38483 USA

Mushroom Mountain (South Carolina)

http://www.mushroommountain.com/
soreprints@gmail.com

864-855-2469

129 Merritt Rd
Liberty, SC 29657

Mycosource Inc (Ontario, Canada)

http://mycosource.com/
office@mycosource.com

416-402-9755

416-963-5520

Office: 21 Maple Avenue Toronto ONCanada M4W 2T5
Farm: R.R. 1 Goodwood ON Canada L0C 1A0

North Spore (Maine)

http://www.northspore.com

info@northspore.com

Phone: (207) 845 -3500

Out-Grow (Illinois)

https://www.out-grow.com.
11321 N. Hulbert Rd

Mc Connell, IL 61060
(800) 882-8213

Smugtown Mushrooms (New York)

http://www.smugtownmushrooms.com/
smugtownmushrooms@gmail.com

585.690.1926

Mushroom Resources:

Educational Videos:
Growing Oyster Mushrooms on Straw https://www.youtube.com/watch?v=I6PE6D6JjFM
Specialty Mushroom Production in the US https://youtu.be/zTa52USuL3s
Oyster Mushroom Cultivation on Coffee Grounds:
https://www.youtube.com/watch?v=ui5eK7Qb5So
Mushroom Safety https://www.youtube.com/watch?v=kdt8dDgiimo
Mushrooms in Rural and Urban Areas https://www.youtube.com/watch?v=gfmaHGDeZSE
Mushroom Farming in Nepal https://www.youtube.com/watch?v=YQZRA_CReyo
Growing a Mushroom Enterprise https://www.youtube.com/watch?v=MK0V8nmNl-U
Financial Planning for Mushroom Enterprises: https://www.youtube.com/watch?v=hZHerEejE2s

Beekeeping Resources from Cornell Small Farms Course

Basic Bee Biology for Beekeepers – Extension

- https://bee-health.extension.org/basic-bee-biology-for-beekeepers/

BeeScape – an interactive website which allows you to obtain metrics on local landscapes for bees, including:

- 1) the different types of plants in a 3 or 5 km radius of your apiary (wildflowers, forest, corn, other crops, developed land, wetlands, etc.),
- 2) how floral resources change over seasons,
- 3) predicted pesticide use and toxicity levels, and even
- 4) nesting resources for wild bees.
- https://beescape.org/

Cornell Pollinator Network:

- https://pollinator.cals.cornell.edu/

NY Bee Wellness

- https://nybeewellness.org/

Empire State Honey Producers Association

- http://www.eshpa.org/beekeeper-resources/

Beekeeping Clubs in NYS

- https://pollinator.cals.cornell.edu/resources/beekeeping-clubs-nys/

University of Guelph Honey Bee Research Centre YouTube Channel

- https://www.youtube.com/channel/UC3mjpM6Av4bxbxps_Gh5YPw/featured

Books:

- The Beekeeper's Handbook by Diana Sammataro and Alphonse Avitabile
- Bee Biology and Beekeeping by Dewey Caron
- The Backyard Beekeeper by Kim Flottom
- Beekeeping for Dummies 4th edition

Hive ID: Origin:

Temper:C (calm) N (normal) A (aggressive)

Brood Pattern: S (spotty) G (good) E (excellent)

Feed Type: PP (pollen patty), WP (winter patty), S1 (syrup 1:1), S2 (2:1)

	Sighted				Population			Temper					L (low) A (average) H (high)						
Date	Queen	Egg	Larva	Brood	L	M	H	C	N	A	Queen Cells Y/N	Brood Pattern	Pollen Stores	Honey Stores	Hive Beetle	Varroa Mite	Feed Type	Notes	Name

Credit: Erin Masterson of
Masterson's Garden Center

Getting Started: Small Scale Beekeeping

Equipment Costs

Hive equipment: $250/hive
Honeybee Nucleus Colony: $175-$200

Protective gear (suit, gloves): $150 - $200

Tools (smoker, hive tool, frame rest): $50-$60

Honey extraction equipment: $200 - $1200

Treatments

2-3 treatments per year, cost depends on treatment being used

Formic acid (FormicPro) $6-$10/treatment
Oxalic acid vaporizer $100, acid <$1/treatment

Time Commitment

Bi-weekly inspections: 10-15 minutes/hive

Treatment for mites, etc.: <5 minutes/hive (depending on treatment method)

Honey harvesting: spring + fall, time varies

Expected Return

Average production/hive: 50-60 lbs honey + wax X $10/lb = $500-600 in honey sales

Value added products (lip balm, soap, candles, etc)

Erin Masterson Holko
erin@mastersons.net
(716) 655-0133

When buying goats, especially breeding animals, they should come from a herd that is free of the following diseases:

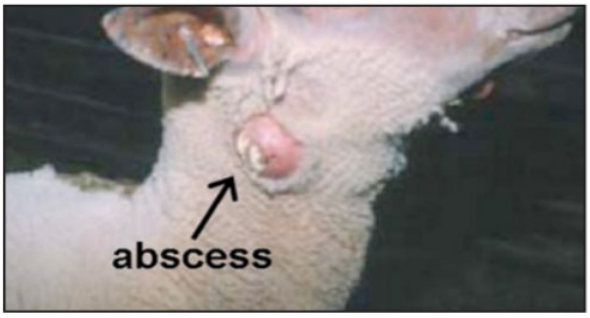
This picture is of a goat with foot scald. *Photo Courtesy of UK and KSU Goat Producers Newsletter, December 2008.*

Foot Rot

Cause: Bacteria enter foot when injured and animals are in wetter areas (can be barn or pasture)

Symptoms: Rotted-looking blisters or sores usually between the claws of the hoof

Concern: Hard to get rid of, spreads easily, reduced weight gain, reduced reproductive capabilities



This sheep has caseous lymphadenitis. *Photo Courtesy of Dr. Justin Luther, Ph.D., and Dr. Charlie Stoltenow, DVM, North Dakota State University*

Caseous Lymphitis (CL)

Cause: Bacteria *Corynebacterium pseudotuberculosis*

Symptoms: Abscess at infection site or nearby lymph node

Concern: Chronic wasting disease, decreased weight gain, decreased wool growth, lower milk production, reduced reproductive capabilities, death. Can spread to humans.

Purdue University

Sore Mouth

Cause: Viral skin disease

Symptoms: Blisters on the lips, nose, udder, teats, junction of the hoof and/or lower leg

Concern: Lose body weight, don't grow well, susceptible to other diseases, females may not allow offspring to nurse

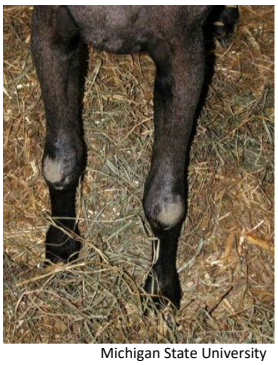
Johnes

Cause: A bacterium called "MAP"

Symptoms: Rapid weight loss, diarrhea, affected goats still eat well

Concern: Symptoms may not show up for months or years in infected animals, infected mothers can infect offspring through the placenta, infected animals will waste away and die

When buying goats, especially breeding animals, they should come from a herd that is certified to be free of the following diseases:



Michigan State University

Goats.extension.org

Caprine Arthritis Encephalitis (CAE)

Cause: A virus

Symptoms: Varied. Can include stiffness, lameness, weight loss, mastitis, pneumonia, inflammation of brain, deep and chronic cough, trouble breathing

Concern: Contagious, spreads from infected mothers to kids through milk and/or from adults to other adults, low weight gains, decreased milk production, death. No treatment available

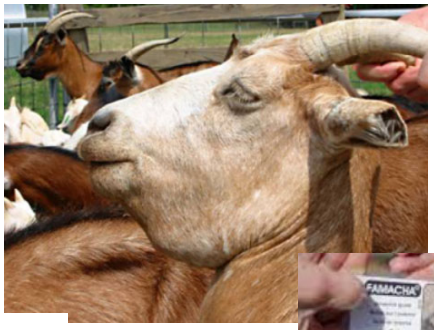
University of Maryland

Pink Eye

Cause: Bacteria entering eye, usually through injury

Symptoms: Repeated blinking, tearing, cloudiness of eye, red and inflamed mucous membranes

Concern: Easily transmitted, hard to cure, weight loss, reduced weight gain, blindness



Dr. Ray Kaplan, DVM, University

University of Rhode Island

Anemia from Internal Parasites

Cause: Tapeworms, roundworms, or Coccidia

Symptoms: Weight loss, anemia (loss of mucous membrane color), bottle jaw, diarrhea

Concern: Lose weight, attract flesh eating flies, secondary infections, death

Alabama Cooperative Extension

Pneumonia/Respiratory Illness

Cause: Bacteria or virus that infects the lungs

Symptoms: Fever, difficulty breathing, excess mucous, weight loss, depression

Concern: Failure to grow and thrive, death

Basic Goat Supplies

- Buckets (water) $3
- Hoof Trimmers $20
- Hay per square bale $3-$6
- Grain per 50lbs bag $11
- Minerals per 50lbs bag $25
- Fencing wire 330 ft roll $290
- Metal T post $4
- De-wormer $85

Local Goat Breeders

Meyer-Beebe Boer Goats

Address: 5898 E Arcade Rd, Arcade, NY 14009

Phone: (585) 322-2389

Kiko Goats

ERIC ANDERSON

E&M GOATS

ADDRESS: 3788 EAST BECKER RD

CITY/ST/ZIP: COLLINS CENTER, NY 14034

PHONE: Cell (716) 353-6708

EMAIL: primordialsludge@gmail.com

HUMANE (HALAL) ON-FARM SLAUGHTER OF SHEEP AND GOATS


Step 1

Minimize stress when catching animals. Avoid sudden moves or noises. Herd animals into small area. Catch gently.


Step 2a


Step 2b


Step 2c


Step 2d

Move animal to slaughter quickly, without stress. If small enough, carry with one arm over the horns and other arm tucked between hind legs [Step 2a]. For larger animals, have one person lead animal with chin held high, while another person pushes from behind [Step 2b]. If handler is alone, hold animal's chin with one hand while grasping the dock or tailhead area with the other hand, or carry forelegs to lead the animal [Step 2c]. A chute or lane can be used to move animals calmly [Step 2d].


Step 3a


Step 3b

For humane reasons, do not shackle the animal for slaughter. Place the animal on a double rail [Step 3a] or firmly restrain the animal [Step 3b], which is safe and comfortable for both animals and people.


Step 4a


Step 4b

A well sharpened slaughter knife with a straight blade twice the neck width is absolutely necessary for making the slaughter humane [Step 4a]. A knife with a hand guard is safest.* If the handler is alone and the animal is docile, it can be slaughtered by straddling the animal next to a wall [Step 4b].

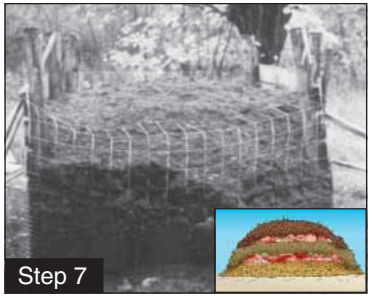

Step 5

Slaughter gently but firmly by holding animal's head back, and in a quick, single cut move across animal's throat just below the jawbone, cutting the wind-pipe, esophagus, arteries and veins forward of the neckbone.


Step 6a


Step 6b

It is both a halal law and a requirement for animal welfare to wait until the animal is insensible (at least 1 minute) before starting further processing [Steps 6a and 6b].


Step 7

Dispose of the offal (animal remains) by composting or other sanitary and legal means. To use the static-pile composting method [inset], alternate layers of offal with high-carbon materials, such as wood chips, straw, leaves, peat or finished compost. This method also protects against odor and vermin. For more information, see www.cfe.cornell.edu/wmi/composting.html.

* One source for slaughter knives is www.dexter-russell.com.

This poster was produced by the Northeast Sheep and Goat Marketing Program and was funded by USDA.

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IFANCA
5901 North Cicero, Suite 309
Chicago, IL 60646
773.282.3708 / www.ifanca.org

For more information about humane halal slaughter of more than one or two animals at a time, please consult the following Web sites:

Cornell Sheep Program (www.sheep.cornell.edu)

Empire State Meat Goat Producers Association (www.ansci.cornell.edu/extension/esmgpa.html)

Islamic Food and Nutrition Council of America (IFANCA) (www.ifanca.org)

Northeast Sheep and Goat Marketing Program (www.sheepgoatmarketing.org)

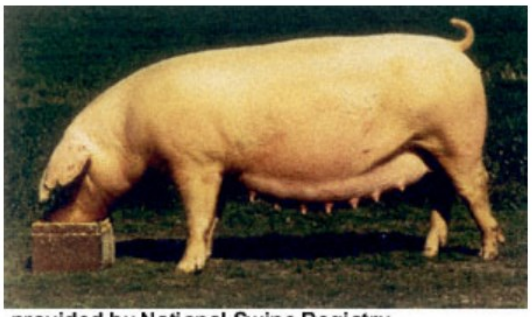
Temple Grandin (www.grandin.com)

07/03

Common Pig Breeds in New York State

Information shared in this document is from Oklahoma State University

This list is not inclusive of all breeds of pigs available in the region and state. No one breed is supported by Cornell Cooperative Extension. Furthermore, it is not guaranteed that all breeds listed here will thrive in all production systems.



provided by National Swine Registry

Breed: American Landrace

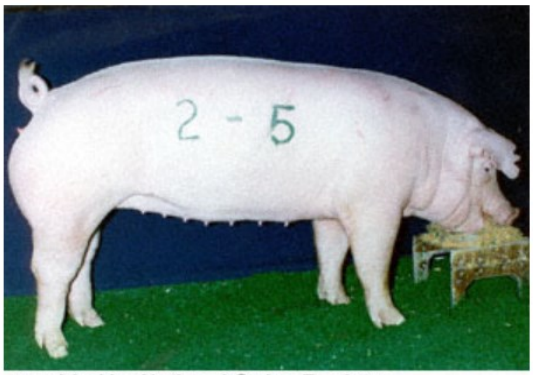
Type: A variant of the Large White. Long body with 16-17 pairs of ribs. Meaty carcass characteristics. Lean. About 6 months from 50-lb piglet to maturity (250 lbs).

Housing System Preference: Confinement

Breed: Berkshire

Type: Black and white. Quality meat (juciness, tenderness, flavor) with high fat content. About 6 months from 50-lb piglet to maturity (250 lbs).

Housing System Preference: Pasture or Forest



provided by National Swine Registry

Breed: Chester White

Type: Mix of large white breeds. Meaty carcass. Lean. About 6 months from 50-lb piglet to maturity (250 lbs).

Housing System Preference: Confinement or pasture (need shade)

provided by National Swine Registry

Breed: Duroc

Type: Reddish-brown pig, but can vary in color. Medium length body and floppy ears. Good muscling. Tender meat. About 6 months from 50-lb piglet to maturity (250 lbs).

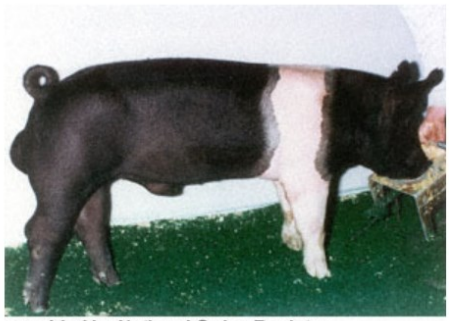
Housing System Preference: Pasture

Provided by Michael von Luttwittz

Breed: Gloucestershire Old Spots

Type: White with black spots. Very tame. Broad and deep-bodied. Great foragers and utilizers of farm byproducts such as produce and whey. Lean and good for bacon. Reaches market weight of 260-280 lbs in 5 months (after buying 8 week old piglets)

Housing System Preference: Pastures, orchards



provided by National Swine Registry

Breed: Hampshire

Type: Black with white belt. Larger sized. Good foragers. Lean meat, large loin eyes, minimal back fat. About 6 months from 50-lb piglet to maturity (250 lbs).

Housing System Preference: Pasture or confinement

Breed: KuneKune

Type: Docile. Smaller, short legs, rounded look, short snout. Very limited rooting because of short snout. Can fatten on grass. Fatty, especially if confined and fed grain. Fattier, marbled meat. An 8 week old piglet needs 12-16 months to reach a weight of 120 - 200 lbs.

Housing System Preference: Pasture

Breed: Large White

Type: Common commercial breed. Large. Lean. Fast grower. Valued for bacon production. About 6 months from 50-lb piglet to maturity (250 lbs).

Housing System Preference: Pasture or confinement

Photo from Modernfarmer.com

Breed: Mangalitsa

Type: Lard (fat producing) breed. Thick, woolly coat. Withstand wind and cold well. Juicy, flavorful meat. An 8-week-old piglet reaches 280-300-lbs at 13 months.

Housing System Preference: Pasture or confinement

Breed: Ossabaw Island Hog

Type: Small, heavy-coated, long snouts. Dark meat with a unique texture. Fatty. An 8-week piglet takes 9-11 months to harvest, with a market weight of 240lbs.

Housing System Preference: Pastures, woods

Breed: Red Wattle

Type: Red-haired with wattles on neck. Docile. Lean, large carcass. Rapid growth. Marbled, flavorful meat. About 5-6 months from 8 week old piglet to maturity (250 lbs).

Housing System Preference: Pasture or confinement

Provided by Michael von Luttwitz

Breed: Tamworth

Type: Brown or red-haired. Deep bodied. Smaller meat. Great foragers. Good meat yield. Lean. Can do well on lower energy foods, but will grow more slowly. Hardy and tolerant of wind and cold. About 5-6.5 months from 8 week old piglet to maturity (300 lbs).

Housing System Preference: Pasture

Breed: Yorkshire

Type: Common commercial breed. Larger and muscular, with mostly lean meat and little backfat. Good growth rates and efficiency. About 6 months from 50-lb piglet to maturity (250 lbs).

Housing System Preference: Confinement

Getting Started With Pigs

Housing Indoors:

- Indoor area: Minimum of 8 square feet per pig
- Clean regularly to keep dry and reduce odor
- Bedding can be straw, hay, wood shavings, corn stalks, etc.

Photo from thepigsite.com

Photo from NCSU

Housing Outdoors:

- Stocking rate for growing pigs is 1/20 acre each
- Create multiple paddocks and rotate weekly
- Need shelters (3-sided is ok)
- Move water regularly to prevent wallowing
- Train pigs to electric fence, if using

Photo from Heritage Hill Farm

Water:

- Nipple drinkers are preferred to reduce spilling water
- Pigs will spill water buckets

Food:

- Most expensive part of raising pigs!
- Completely formulate pig pellet fed as primary ration
- Pigs can eat scrap food and produce as supplements
- Do not feed pork to pigs
- Pigs cannot get enough nutrition from pasture or scraps alone