



Housing Design and Ventilation

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Show Poultry Housing

- ▶ Does not need to be fancy
 - Keeping birds comfortable
- ▶ Does not have to be a new, permanent or separate structure
 - Ex. Garage, storage shed, etc.
- ▶ Turkeys require a more substantial structure or pen than chickens

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Housing Must Provide

Best environment for birds at all times

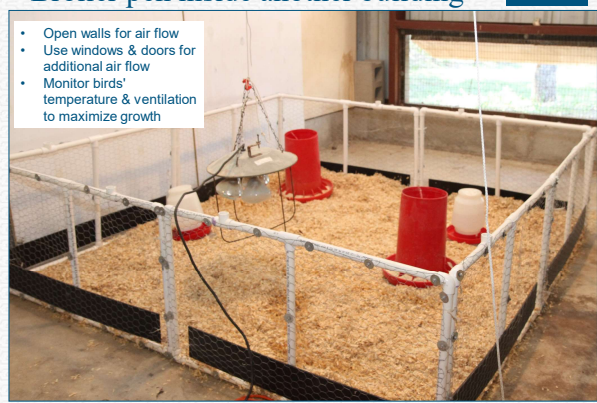
- ▶ Protection from weather extremes
 - Rain, wind, direct sun, cold, etc.
 - Adjust to winter and summer conditions
- ▶ Protection from predators (house pets/varmints)
 - Particularly at night
- ▶ Provide a comfortable environment to maximize growth
 - Controlling temperature, ventilation, air flow

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Broiler pen inside another building

- Open walls for air flow
- Use windows & doors for additional air flow
- Monitor birds' temperature & ventilation to maximize growth



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A simple turkey pen



- Adjustable plastic sheet to adapt to weather and temperature conditions
- Wire to protect birds from predators
- Stir fans

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Principles of Housing Design

- ▶ Shape of house
 - Rectangular is better than square
 - Better for natural ventilation
 - ▶ Minimizes the distance air must travel through the pen in naturally ventilated houses
 - ▶ Variation in temperature throughout the pen will decrease




- Better for mechanical ventilation
 - ▶ Shorter distance the fans have to pull the air
 - ▶ Hold ventilation constant rate, air speed increases as cross-sectional area decreases

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Principles of Housing Design

► Materials

- Metal is fine for exterior walls and roof
- Metal not recommended for interior surfaces unless insulated well
 - Metal is an excellent conductor of heat (radiant heat transfer)
- No exposed insulation, foam board, or other materials birds can peck, consume, & destroy

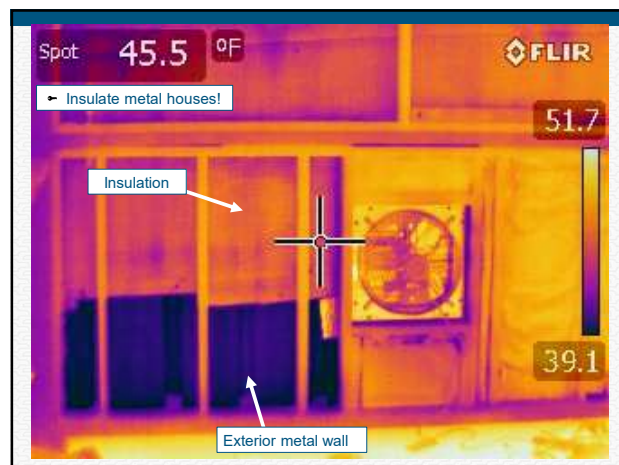
► Cleaning and disinfection should be considered for interior surfaces

- Lower porosity materials are easier to clean
- Paint can help to seal wood surfaces for easier cleaning



Shed B

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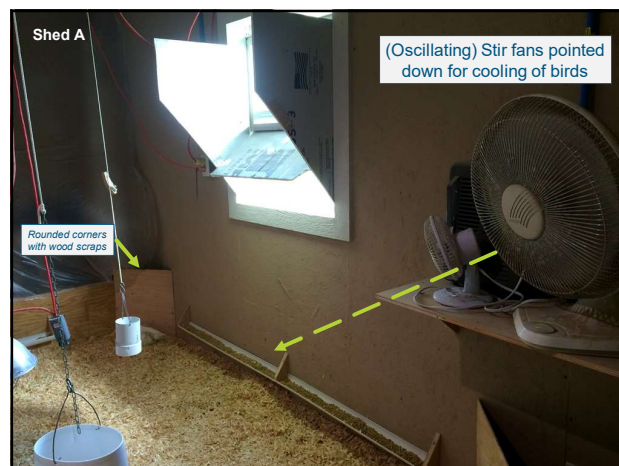
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Principles of Housing Design

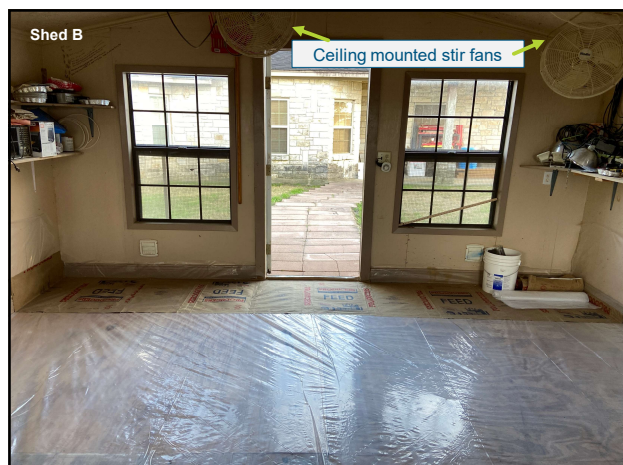
► Stir fans

- In naturally-ventilated houses, stir fans help to move air across birds on low breeze days to increase convective cooling
 - Air flowing across the birds will keep them cool
- "To maximize air movement over birds, circulation fans should generally be installed 3 to 5 feet above the floor and tilted downward at a 5° angle" (Mike Czarick, UGA)

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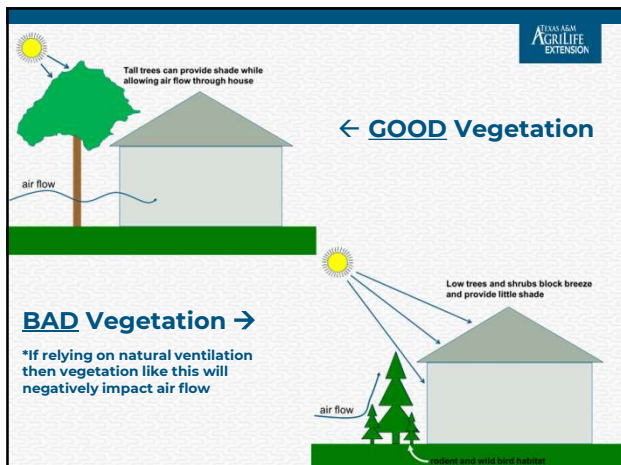
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Location

- Adequate drainage – avoid potential of flooding
- Reduce proximity to habitats for wild birds and predators
- Eliminate harborage for pests and rodents
 - Eliminate trash and brush piles, old equipment
- Natural air flow (breeze) a plus (building it away from existing structures like another buildings, fences, etc.)
- Good visibility from your house (an emergency occurs)
- May want to reduce visibility by neighbors

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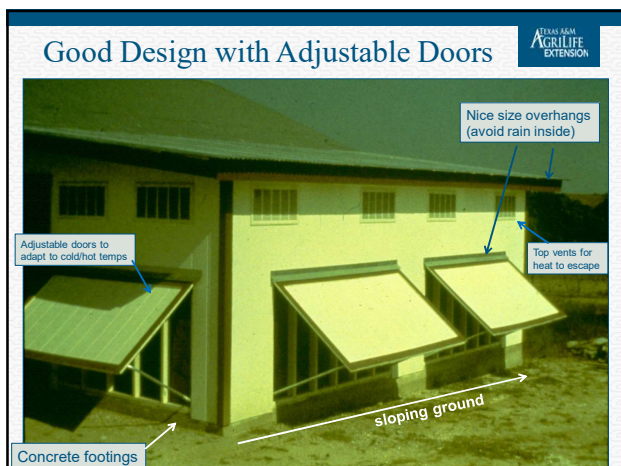
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Principles of Housing Design and Ventilation

► Key concepts

- Minimize the distance air must travel in naturally & mechanically ventilated houses
- As air moves through the building, it will increase in temperature, moisture, dust and waste gas concentration
 - Results in a larger temperature variation at one end to the other end of the pen
- Air speed is an effective way to cool birds (wind chill effect)

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Ventilation

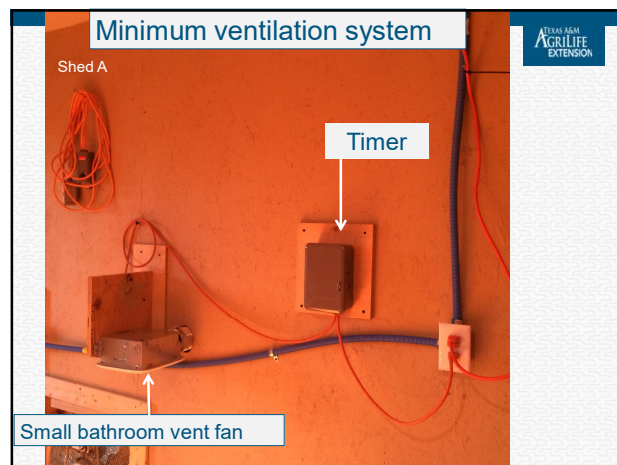
- Ventilation means air exchange
 - Amount of air going in and the amount of air going out
- Ventilation is critical to maintain the best environment for the birds – even in cold weather
- Functions of ventilation:
 - Remove moisture (most important)
 - Helps keep litter dry!
 - Remove excess heat
 - Remove waste gases (carbon dioxide and ammonia)
 - Provide oxygen

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Minimum Ventilation

- A small amount of air exchange needed to remove moisture and waste gases and replenish oxygen
- Easiest with a fan and timer
- If using natural ventilation only:
 - Use a small windrow or curtain crack
 - Ventilate up high, away from birds
 - Be careful of drafts on small chicks

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30 Minute Repeat Cycle Timer

Example here: 2 pins every 5 minutes and each pins is 15 seconds

- Means that every 5 minutes, this timer will kick on the fan for 30 seconds
- Doesn't remove all the heat from the building
- Brings in a puff of fresh air every 5 minutes



Shed A

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60 Minute Repeat Cycle Timer

Example here:

- Runs for 1 minute then
- Off for 10 minutes
- Location: high
 - (BN-LINK Short Period Repeat Cycle Intermittent Timer)
 - \$27.00
- Larger two exhibitor shed
 - 75 birds each exhibitor



Shed B

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Mechanical Ventilation

- Use fans to create negative static air pressure
 - If doing 100% mechanical ventilation and you don't have natural openings
- Pulls or "draws" air through house
- Fans exhaust the air from the house
- Air inlet space must be controlled
 - It determines how the air enters the room
 - Area installed
 - Type used
 - Leaks will reduce effectiveness and reduce desired air flow patterns

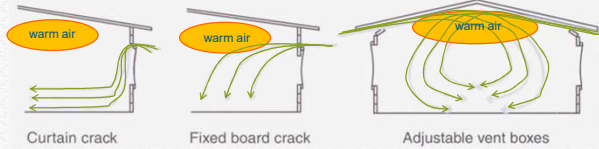
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Air Inlet Style Effects Airflow Pattern

- Cool air will "fall" as it enters the house through side wall openings
- Vent boxes or boards will "throw" air to the center of house and mix with warm air

AIRFLOW PATTERNS WITH DIFFERENT SIDEWALL VENTILATION INLETS



Curtain crack Fixed board crack Adjustable vent boxes

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Example: Incoming cool air directed up and away from birds to avoid chilling chicks



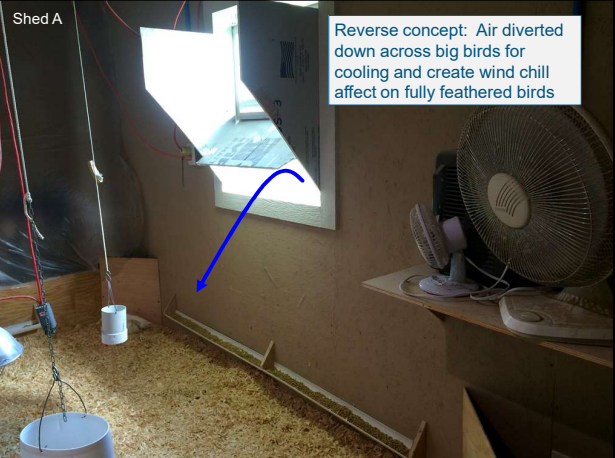
Spot 70.9 °F 81.2 59.0

Foam board warms up as it goes upward

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Reverse concept: Air diverted down across big birds for cooling and create wind chill affect on fully feathered birds



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Temperature Control

- **Thermostats** can be used to control fans and heat lamps to maintain the optimum temperature
 - Temperature control 24 hr/day

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Farmtek Catalog

- Outside/Livestock ones
 - Better with dust and humidity
- Plug into wall
 - Plug into lamp or fan
 - Set the dial temperature

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Heat zones controlled by 2 thermostats

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Day 5

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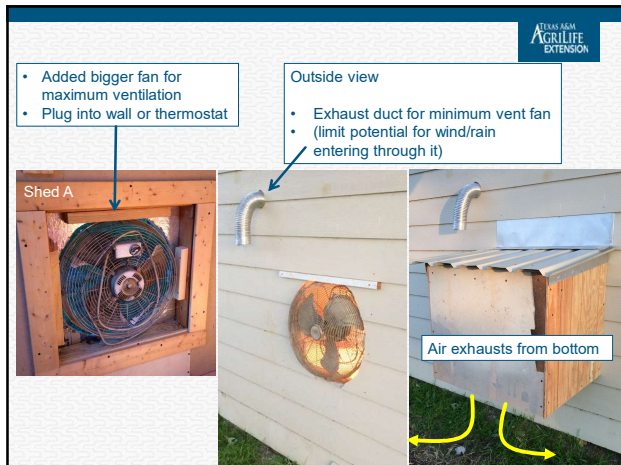
Example: Shed B

1 Thermostat plus probe for each light controlling the heat zone

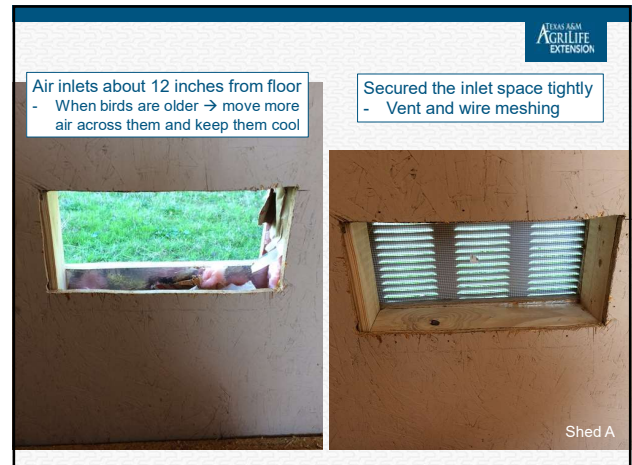
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Shed A : Storage Shed turned Broiler Pen

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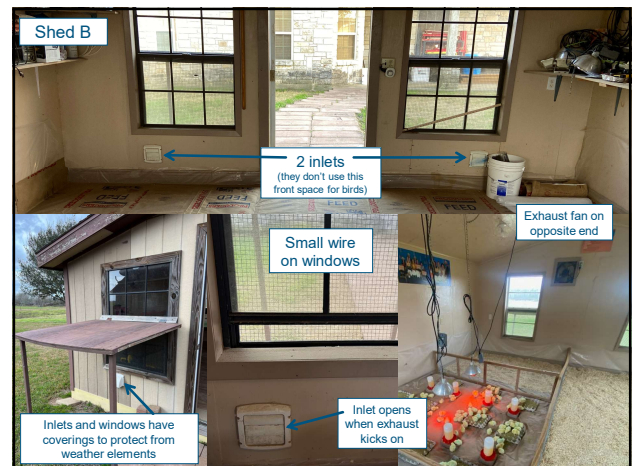
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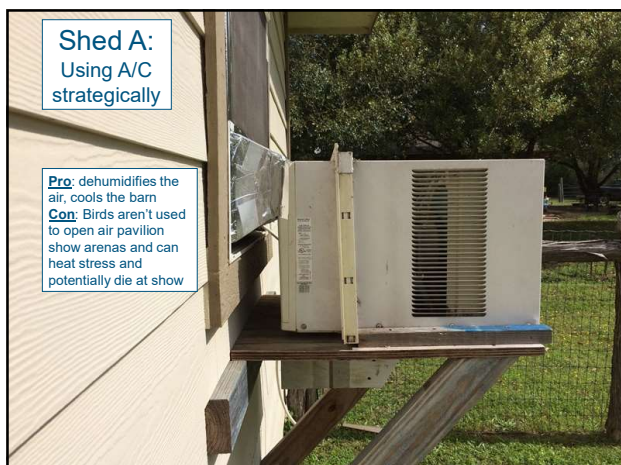
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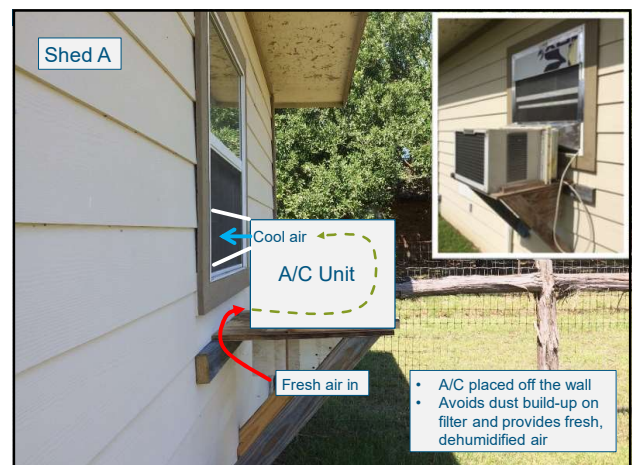
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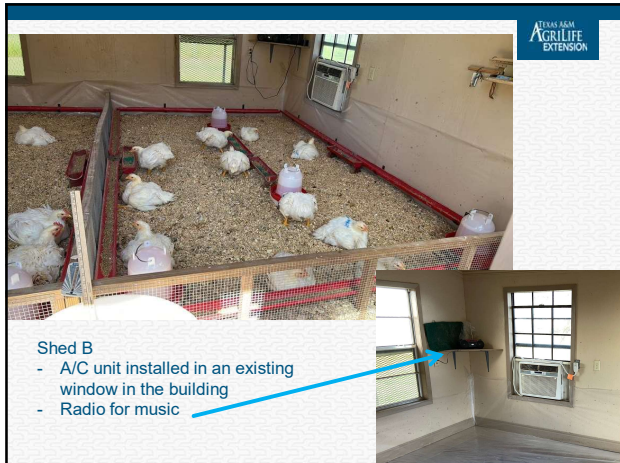
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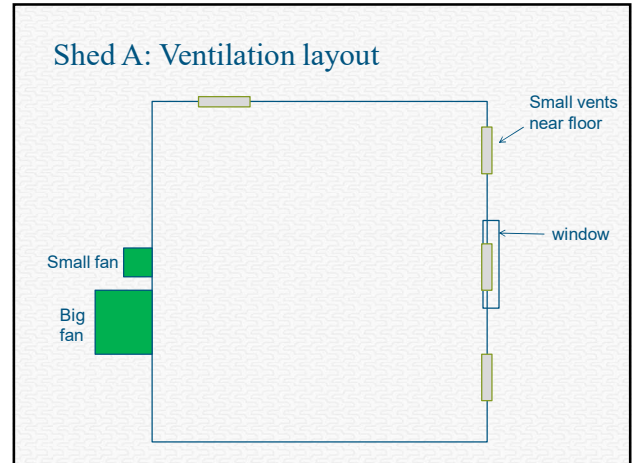
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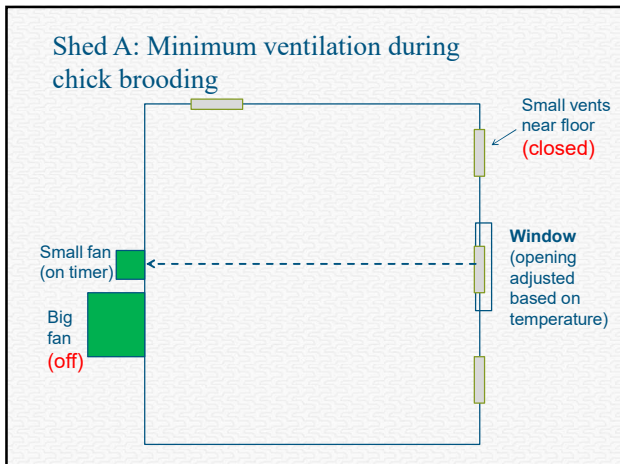
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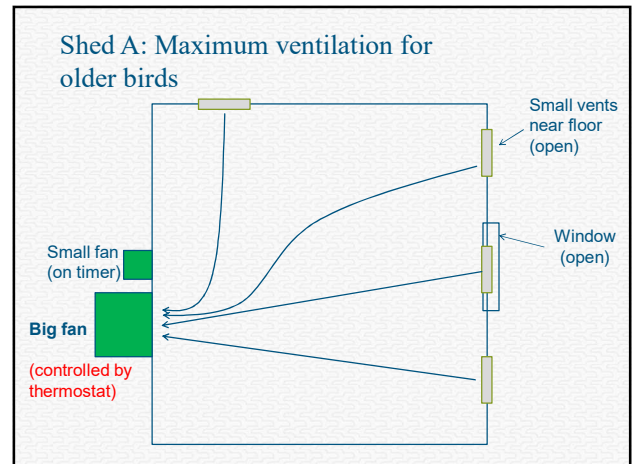
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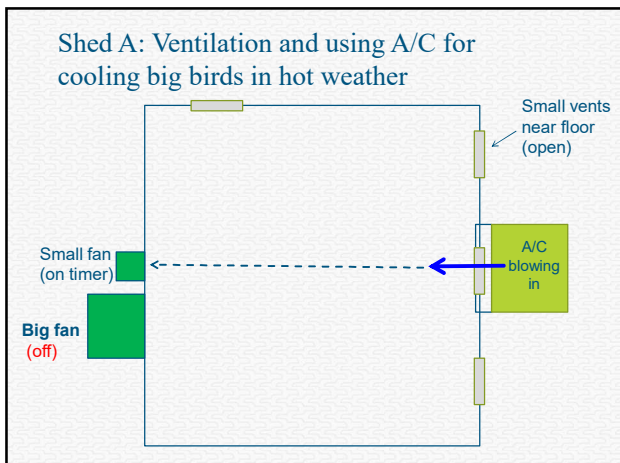
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Housing and Ventilation Summary

► **Objectives:**

- Keep birds safe from weather and predators
- Provide the optimum environment for the comfort of the birds

► **Key elements:**

- Housing must be adaptable as birds grow
- Housing must be adaptable to changing weather conditions
- Ventilation (air exchange) is important to keep in mind
- Design your housing to what is best for your style of management for the type and number of birds you intend to raise

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