

# House Temperature and Bird Performance

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UGA Cold Weather  
Ventilation Workshop 2011

## Getting Chicks Off to a Good Start

- ▶ Brooding Temperature
- ▶ Air quality
- ▶ Litter quality
- ▶ Feed
- ▶ Water
- ▶ Light



## Cold weather

- ▶ In cold weather what are the two first things typically considered to reduce fuel costs?
  - ▶ Run heaters less
  - ▶ Do not exhaust the hot air



## Thermoregulation

- ▶ Chicks can not regulate their body temperature until about two weeks of age.

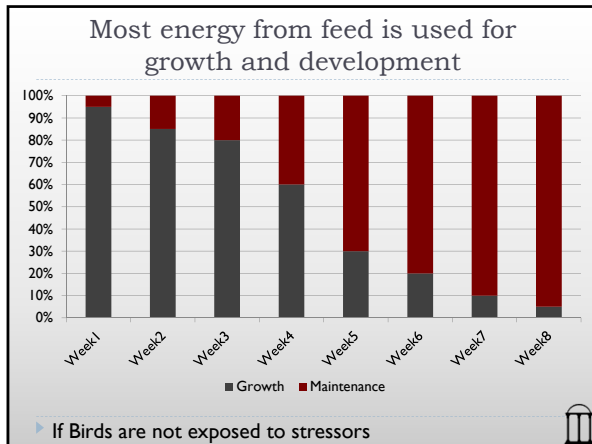


## Why is house temperature so important?



## When is broiler feed conversion most efficient?





### Chicks Cannot Regulate Their Body Temperature

- ▶ Dependent on environmental temperature to maintain body temperature
- ▶ As air temperature decreases, body temperature will decrease

### When Body Temperature Drops

- ▶ Chicks spend more time huddling
- ▶ Immune system impaired
- ▶ Digestive system less efficient
- ▶ Increases breakdown of carbohydrate and lipid reserves
- ▶ Impairs growth

### Thermoregulation development

- ▶ Insulation – feathers
- ▶ Body mass
- ▶ Lowers body mass to surface area ratio
- ▶ Increase in thyroid function
  - ▶ T3

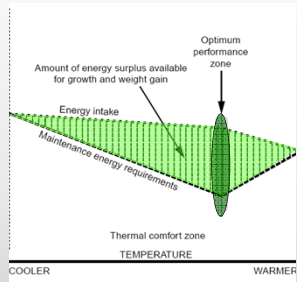
### Temperature sensitivity

- ▶ Broiler housing has to be dynamic
  - ▶ Young chicks are sensitive to cold
  - ▶ Older birds are sensitive to heat

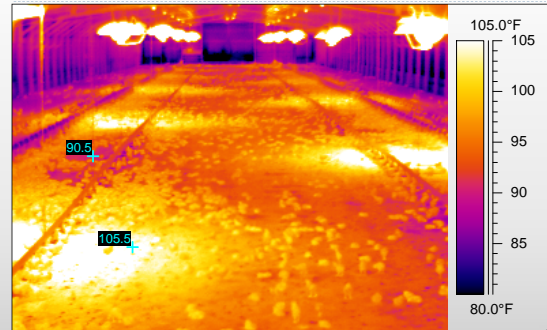
### Performance

- ▶ Optimum performance can not be achieved if the proper brooding temperature can not be maintained.

## Thermal Comfort Zone & Performance



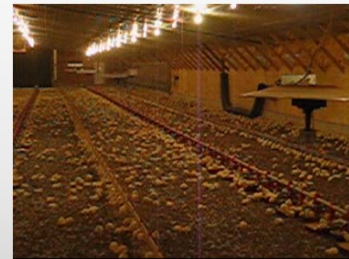
## Chicks will find their comfort zone



## Whether it be closer to the brooder



## Or further away



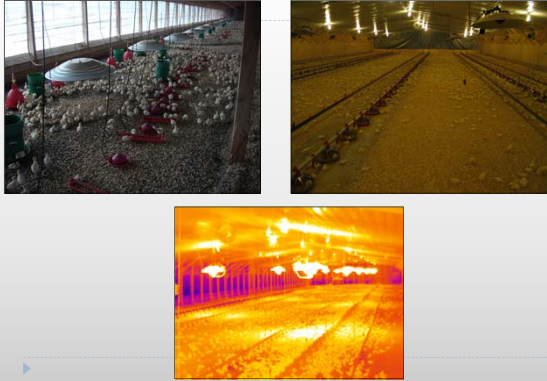
## What do we mean by brooding temperature?

- ▶ Air temperature?
- ▶ Floor temperature?

## Brooding Temperatures



### Brooding Temperatures




### What affect chick body temperature

- ▶ Air temperature
- ▶ Floor temperature
- ▶ Feed consumption
- ▶ Bird density
- ▶ And
- ▶ Relative humidity (RH)

### Relative Humidity and Body Temperature


- ▶ At hatch the chick environment is
 

Temperature	95 F (35 C)
RH	80 %



### Relative Humidity and Body Temperature

- ▶ Poultry House Brooding
  - EFFECTIVE TEMPERATURE??**
    - ▶ Temperature 90 F (32 C)
    - ▶ RH 25%
- ▶ Chicks will be colder
- ▶ Dehydration could result




### Factors that affect broiler chick temperature

- ▶ Floor moisture content
  - ▶ Damp or wet bedding material will chill chicks

### Chilled Chick Symptoms

- ▶ Pile under brooders
- ▶ Huddle in feeder pans and trays
- ▶ Increased mortality
- ▶ Reduced growth rates
- ▶ Poor uniformity
- ▶ Increased incidence of Ascites
- ▶ Fecal droppings wet
- ▶ Pasty vents



## Chilled Chicks



## Brooding Temperature

- ▶ **Low brooding temperatures**
  - ▶ Less movement
  - ▶ Reduce body weight gains
  - ▶ Increased feed consumption
  - ▶ Poor feed conversion



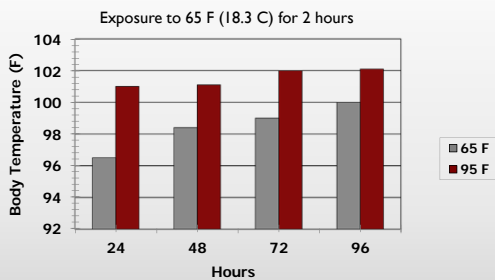
## Low Brooding temperatures can lead to problems later

- ▶ **Metabolic Disorders**
  - ▶ Ascites
  - ▶ Sudden Death Syndrome (flip over)
  - ▶ Leg problems
- ▶ **Bacterial Diseases**
  - ▶ Gangrenous Dermatitis
  - ▶ E. Coli
  - ▶ Salmonella
  - ▶ I.P



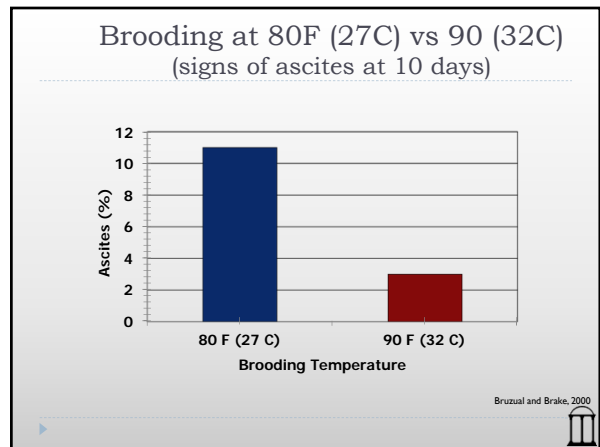
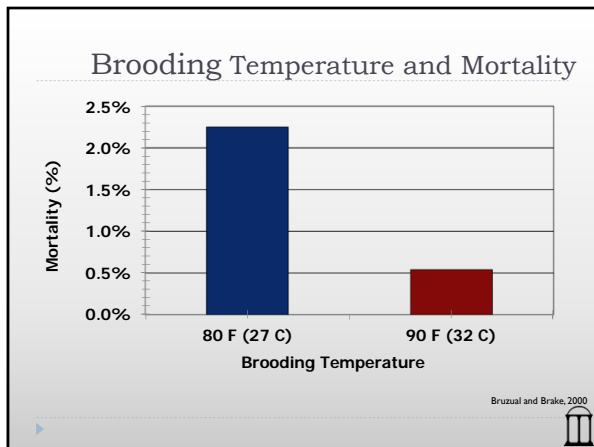
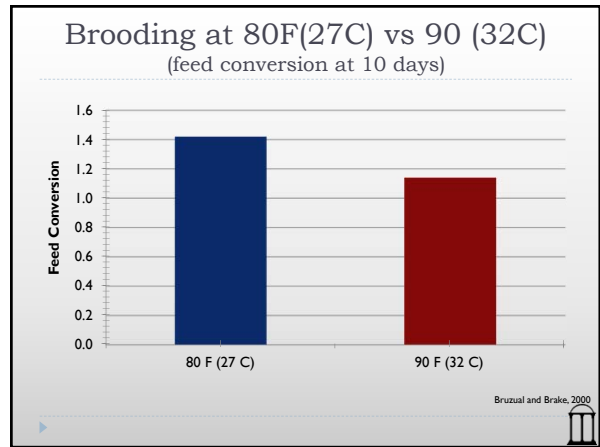
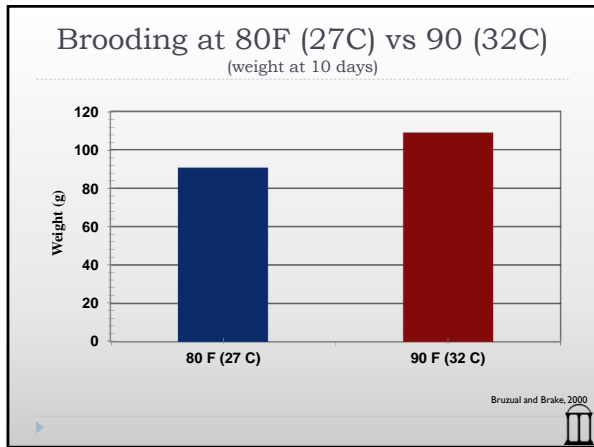
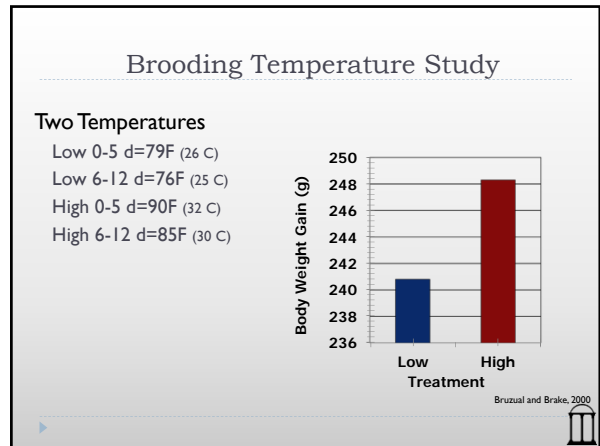
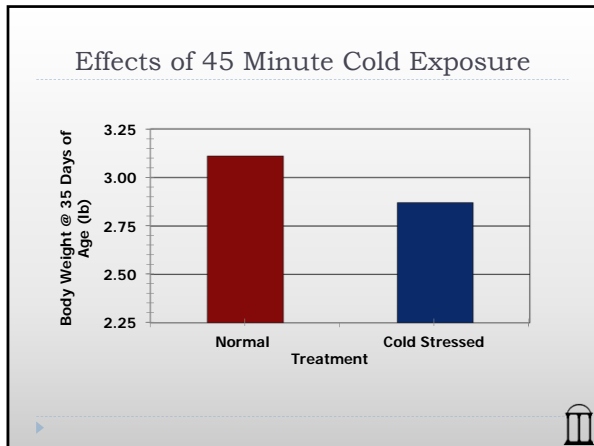
## What Happens when Temperatures are Too Low?

## Brief Cold Exposure

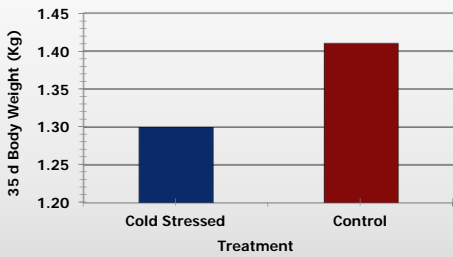


## Long Term Effects of Cold Temperature Exposure

- ▶ Chicks exposed to 55 F (12.8 C) for 45 minutes were compared to chicks at normal brooding temperatures.
- ▶ Birds were grown at normal temps for the remainder of the grow-out



### Birds never catch up



Bruzual and Brake, 2000

### Optimum Brooding Temperatures?

- ▶ High gas prices in the 70's many people lowered brooding temperatures
- ▶ Later work implicated low brooding temps in ascites

### USDA Study (1996)

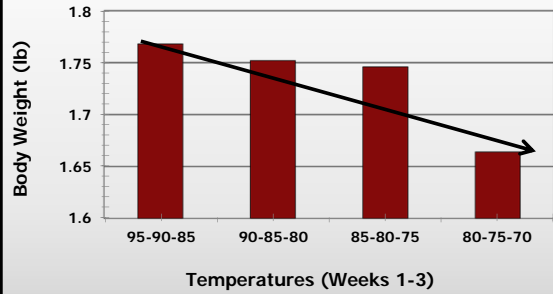
#### ▶ Treatments

#### Week 1

- 95 F (35.0 C)
- 90 F (32.2 C)
- 85 F (29.4 C)
- 80 F (26.7 C)

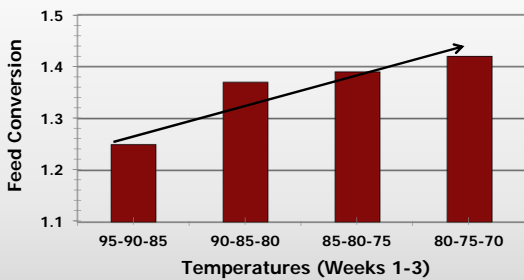
Deaton et al., 1996

### Body Weights (21 d)



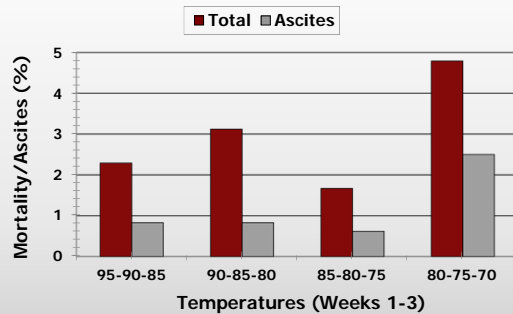
Deaton et al., 1996

### Feed Conversion (21 d)

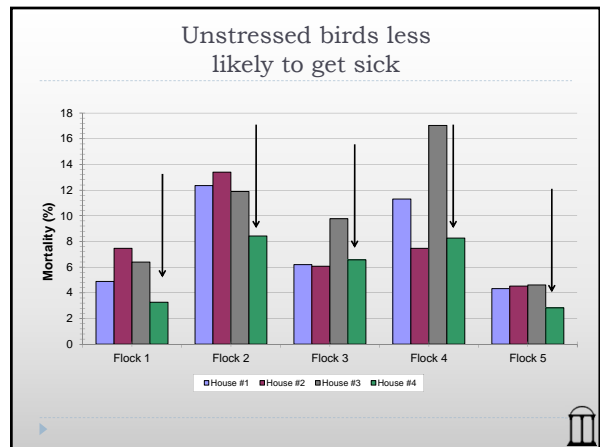
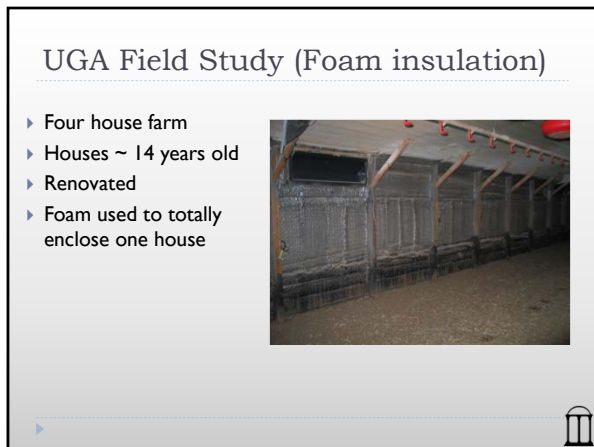
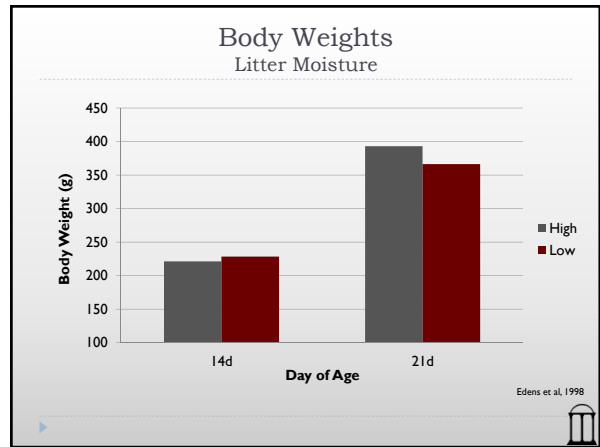
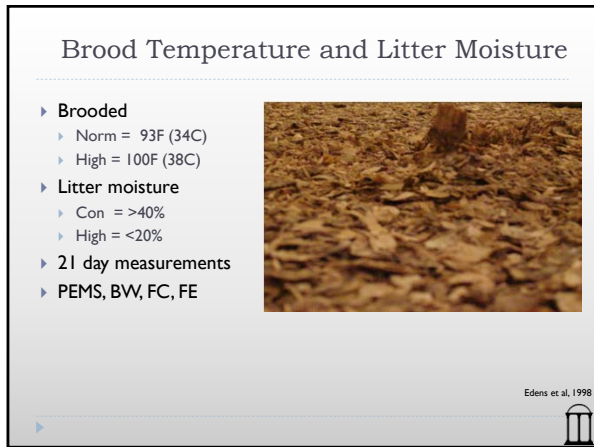
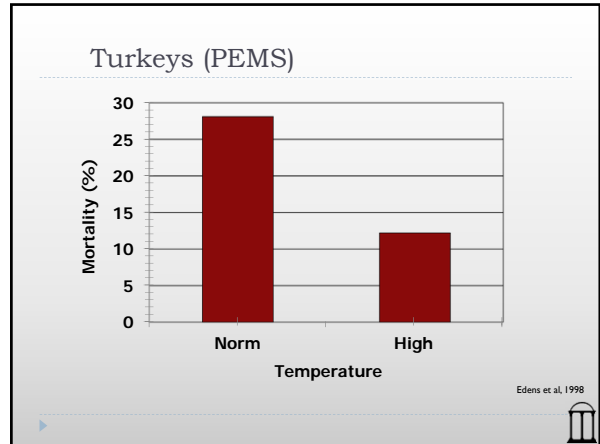
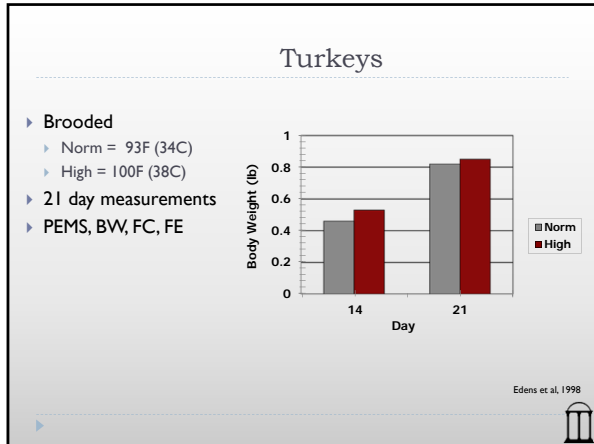


Deaton et al., 1996

### Mortality and Ascites (42 d)



Deaton et al., 1996



## Temperature and Light

- ▶ High light and high brooding temperature result in best performance
- ▶ Alternating these components resulted in lower BW, FC and FE.



Alsam and Washes, 1991

## Keeping birds warm with propane & feed



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Cooperative Extension Service  
College of Agricultural and Environmental Science/Atkins, Georgia 30602-4356



*Poultry Housing Tips*

Keeping birds warm with propane and feed

Volume 11, Number 2

February 2003



There are basically two methods of heating a poultry house during cold weather. The first is to burn propane. The second is to use feed heat. Producers need to use both methods if they want a profitable operation. But, many times a grower will run into problems because they rely too much on one method of heating to the exclusion of the other. The mistake, relying too much on propane for heating a house can obviously lead to high fuel costs, but relying too much on feed heat can lead to bird performance problems and a reduced paycheck.

## What is the correct temperature?

- ▶ Watch the birds and let their behavior guide you



## Steps to successful brooding

- ▶ Floor temperature of 90-95 F (32-35C)
- ▶ Good air quality ( $\text{NH}_3 \leq 25$  ppm)
- ▶ Feed availability
- ▶ Water availability
- ▶ Light
- ▶ Protection from disease and predators

