



# Ham

# Hams

- An American Icon
- We've all had ham in one way or another
- Tradition
  - Christmas Ham
  - Easter Ham
- “City” Ham
- Country Ham or Dry-cured Ham



# City Ham

- Wet cured ham
- Pumped with a “brine”
  - Water, salt, sweetener, phosphate, nitrite, sodium erythorbate, spices and seasonings



# Ways of brining a ham

- Needle injectors
- Stitch pumps
- Artery injection
- Cover brine
- Goal to distribute brine evenly throughout the ham
- Avoid “Tiger Stripes”; uncured spots



# Tumbling Hams

- **Tumble or Massaging**
- **Diffuse brine throughout the ham**
- **Increase binding**
  - Develops protein exudate to aid binding
- **Increase tenderization**



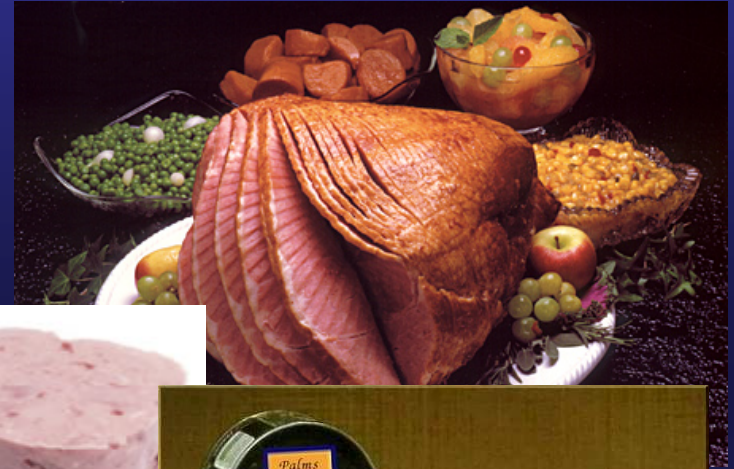
# Types of Hams

- **Get what you pay for!!!**
- **Ham with Natural Juices**
  - 18.5% Protein
  - Very little water added
  - No more than an 8% gain in weight from green weight
- **Ham with Water Added**
  - 17% Protein
  - 10% added ingredients
  - No more than an 8% gain
- **Ham and Water Product**
  - 17% Protein
  - Water labeled as % added



# Other Types of Ham

- Canned Hams
- Boiled Ham
  - Boiled in water
- Spiral Sliced Ham
- Semi-boneless Ham
  - Usually contains femur bone
- Bone-in Ham
- Shank and butt halves
- Boneless Ham
- Pit Ham



# Country Ham

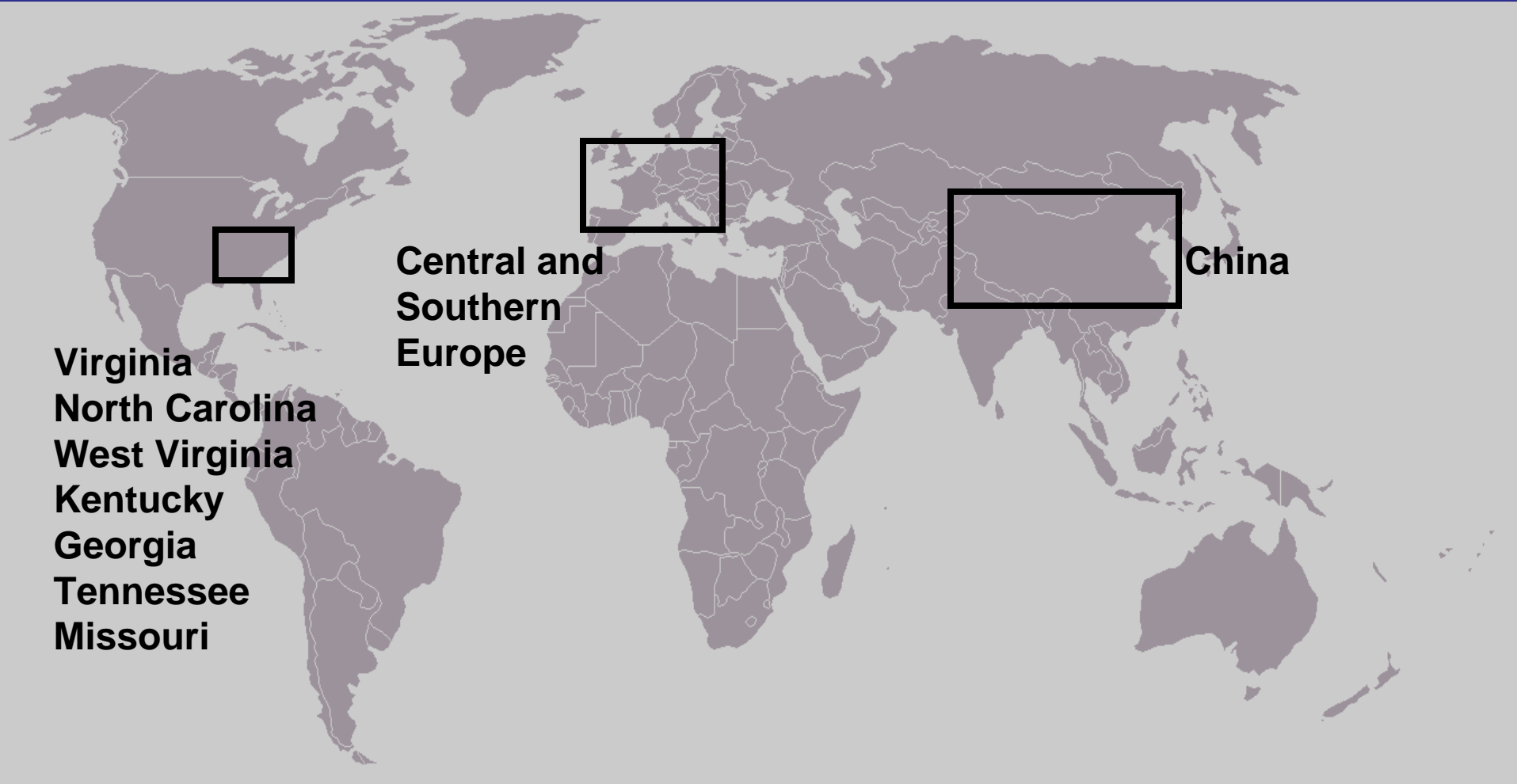
- Dry cured ham
- Salt, Sweetener, Spices, Nitrate (can make without)
- Box cured = 1"/week
- Bag cured = 2 d/lb
- 90 – 100 days to several months





# The Ham Belt

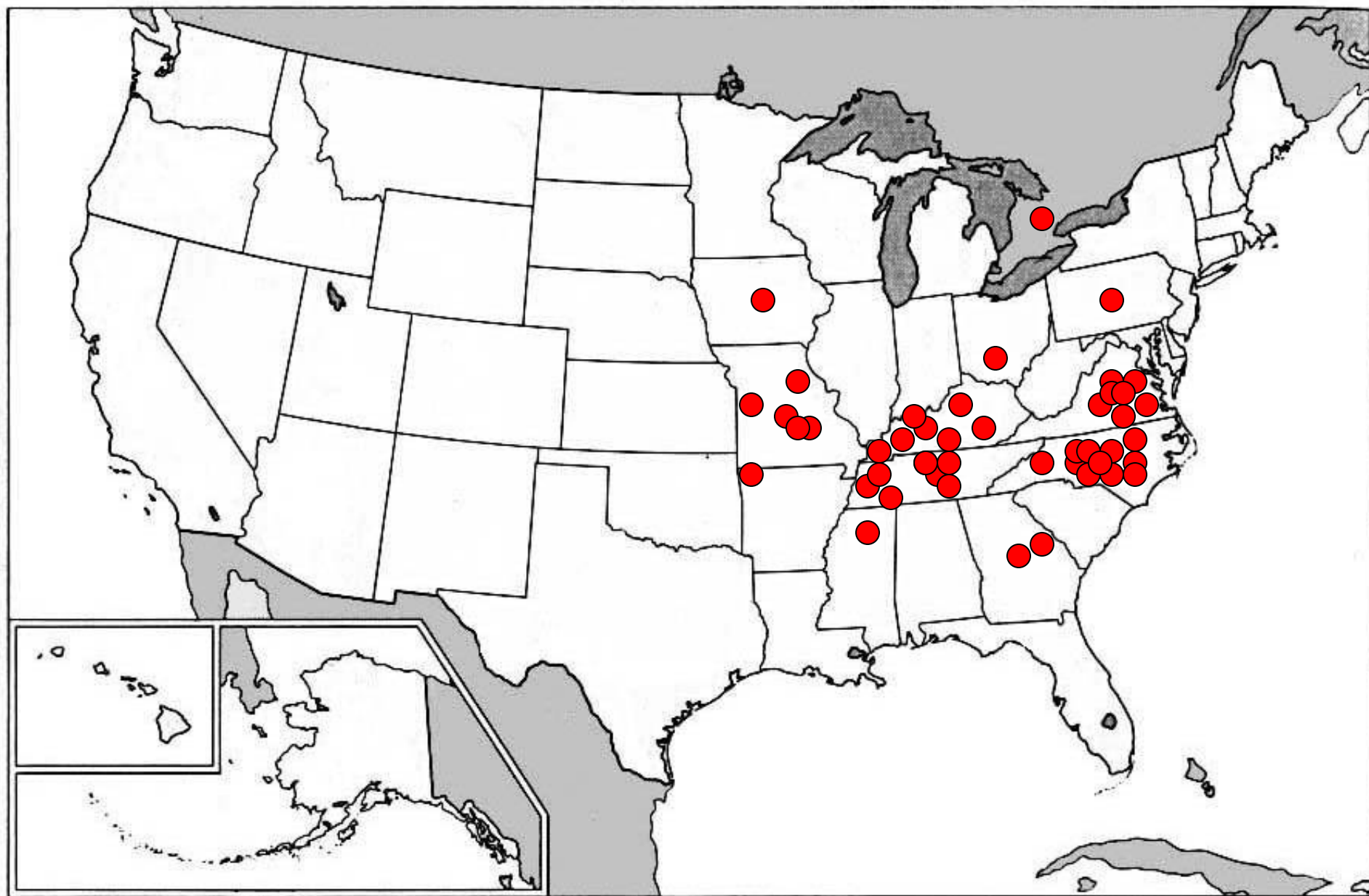
- Regions of the world where dry cured, country-type hams are produced
- Not all dry cured hams are called country hams
- These countries have climates that are optimal for the production of dry cured meats
- Mild winters and springs, hot humid summers



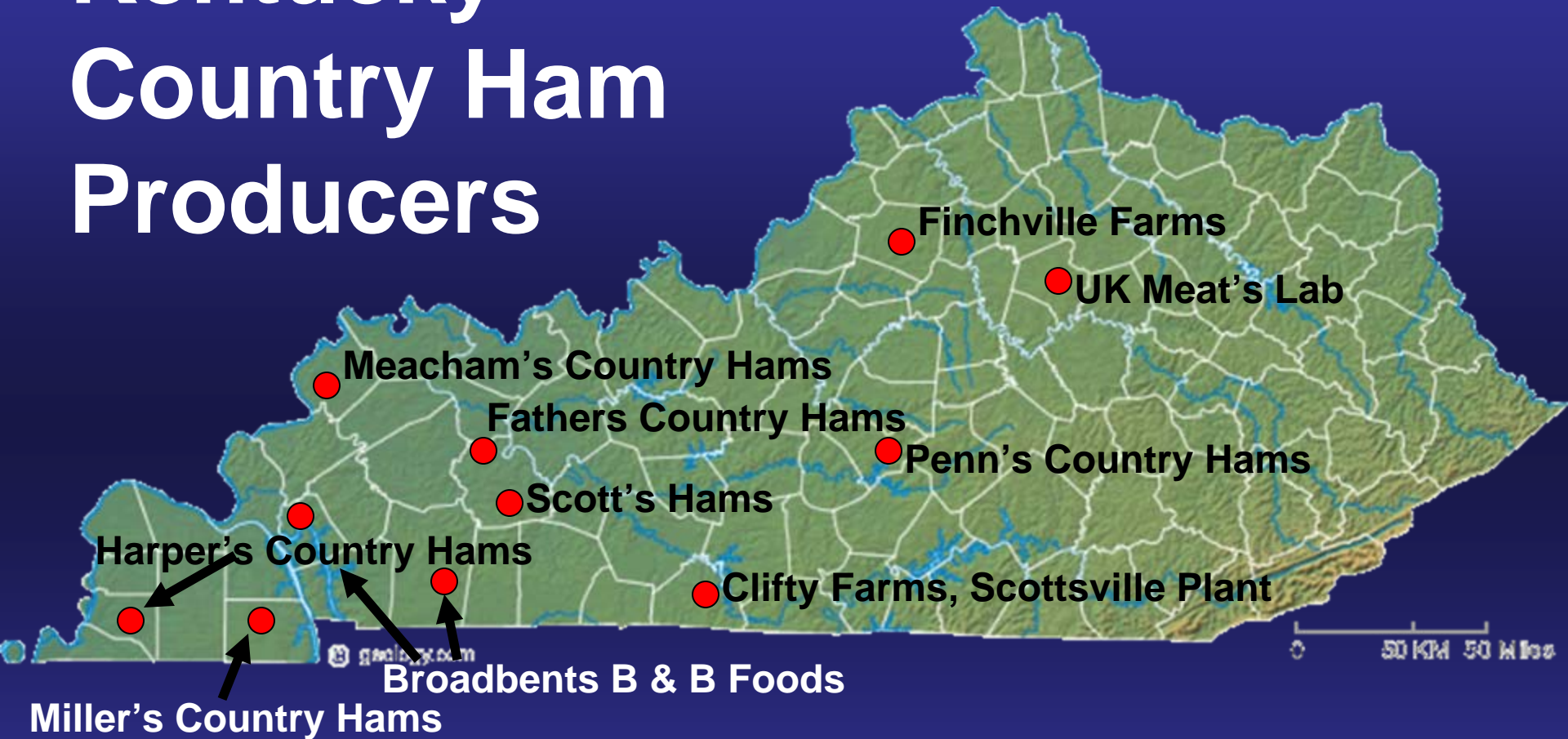
**Virginia**  
**North Carolina**  
**West Virginia**  
**Kentucky**  
**Georgia**  
**Tennessee**  
**Missouri**

**Central and  
Southern  
Europe**

**China**



# Kentucky Country Ham Producers



# National Numbers

- Over 35 Country Ham Curers nationally
- Cure 5 – 10% of the ham supply
- Top Ham Producers
  - 1.) Smithfield Hams, North Carolina
  - 2.) Burgers' Ozark Country Cured Hams, INC, Missouri
  - 3.) Clifty Farms, Tennessee and Kentucky





**CONCORSO INTERNAZIONALE DEL GUSTO**  
[www.saltinordelgusto.com](http://www.saltinordelgusto.com)

**torino**  
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**terramadre**

quattro mandorle  
tra le  
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# Germany

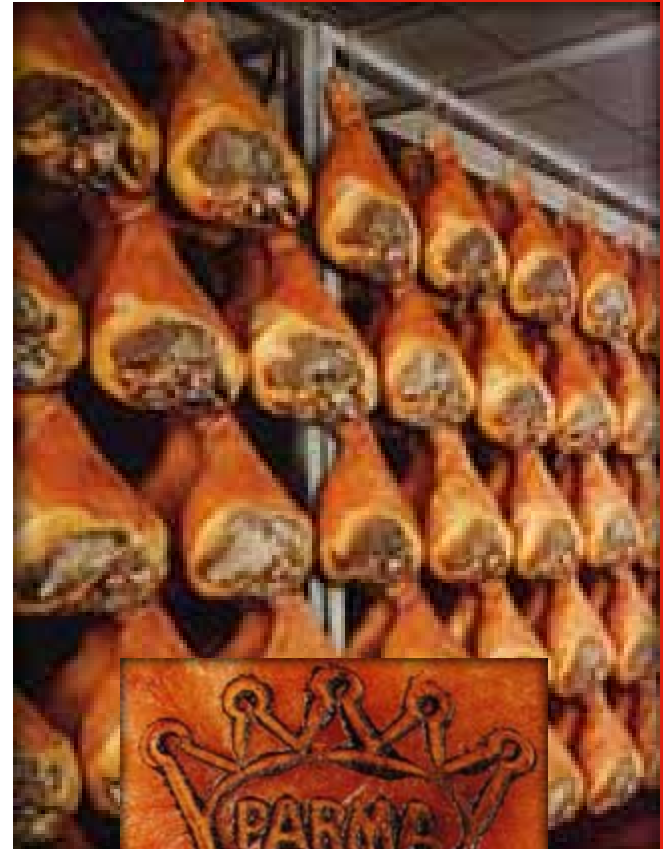
- **Westphalian Ham and Black Forest Ham**
- **Westphalian ham are from pigs fed acorns from the Westphalian Forest**
  - Smoked over Beech wood and Juniper Branches
  - Combination of dry and immersion curing
  - Aged for a month
- **Black Forest are dipped in beef blood to produce the characteristic black surface**





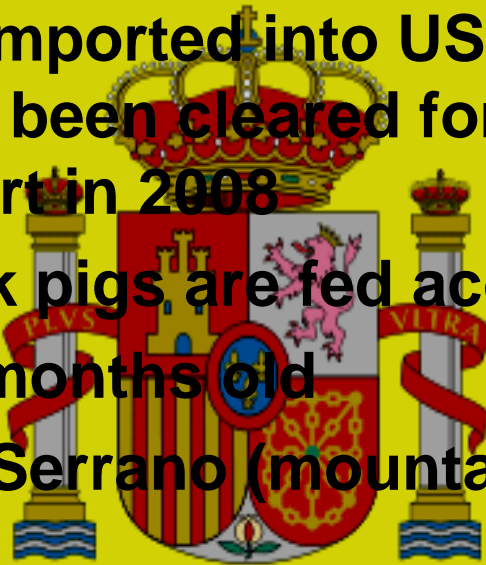
# Italy

- Prosciutto (aka Parma Hams)
- Two Main Types:
  - Prosciutto de Parma
  - Prosciutto de San Danielle
- Yorkshire pigs fed grain, parsnips and whey from parmesan cheese
- Aitch bone removed
- Flattened to ~2"
- Aged for a year or more
- Culatello Ham
  - Expensive and difficult to find in US
  - Butt portion cured with salt, pepper, garlic, and dry wine



# Spain

- Jamon Iberico Ham
  - Most expensive ham
  - Not imported into US, but have been cleared for import in 2008
  - Black pigs are fed acorns
  - 24+ months old
- Jamon Serrano (mountain ham)
  - 18+ months old
  - White pigs fed acorns
  - Can be purchased in the US





# China

- **Jinhua Ham**
  - Named for the city its made in
  - Making hams for over 900 years
  - Aged over 9 months
  - Sun Dried
- **Yunnan Ham**
  - Far western corner of China
  - Very rare



# France

- Bayonne Ham
- Wine cured
- Slightly smoked and air-dried
- Covered with pork fat and flour (Pannage)
- 9 to 10 months old



# England

- York Ham
- True York Hams are cured within 2 miles of York England
- Smoked over oak chips
- Large White Pigs





# How do I make a Country Ham?

- Performed during the Winter months (December and January)
- Coolers
- Salt and sugar will penetrate the ham
- Other seasoning (black & red pepper) typically do not penetrate the ham

# Curing

- Important to get enough cure in the hock and around the aitch bone
- Bone sour is one of the most common problems
- Allow enough time for the cure to penetrate the ham
- Most moisture loss
- After curing hams are sometimes washed, before salt equalization





# Salt Equalization

- Usually 10 - 20° F warmer than curing temperature
- Spring time temperatures
- 2 to 3 weeks
- Allow the salt to equilibrate throughout the ham



# Smoking Hams

- Smoking occurs after salt equalization
- Cold Smoke
  - 12 hours to 7 days
- Cannot let the temperature get above 90° F
  - Kill the enzymes responsible for flavor and aroma





# Aging

- aka “Summer Sweat”
- Develop flavor and aroma
- Proteolysis and lipolysis of the protein and fat contribute to the flavor and aroma
- 50 to 60% Relative Humidity



# The Law

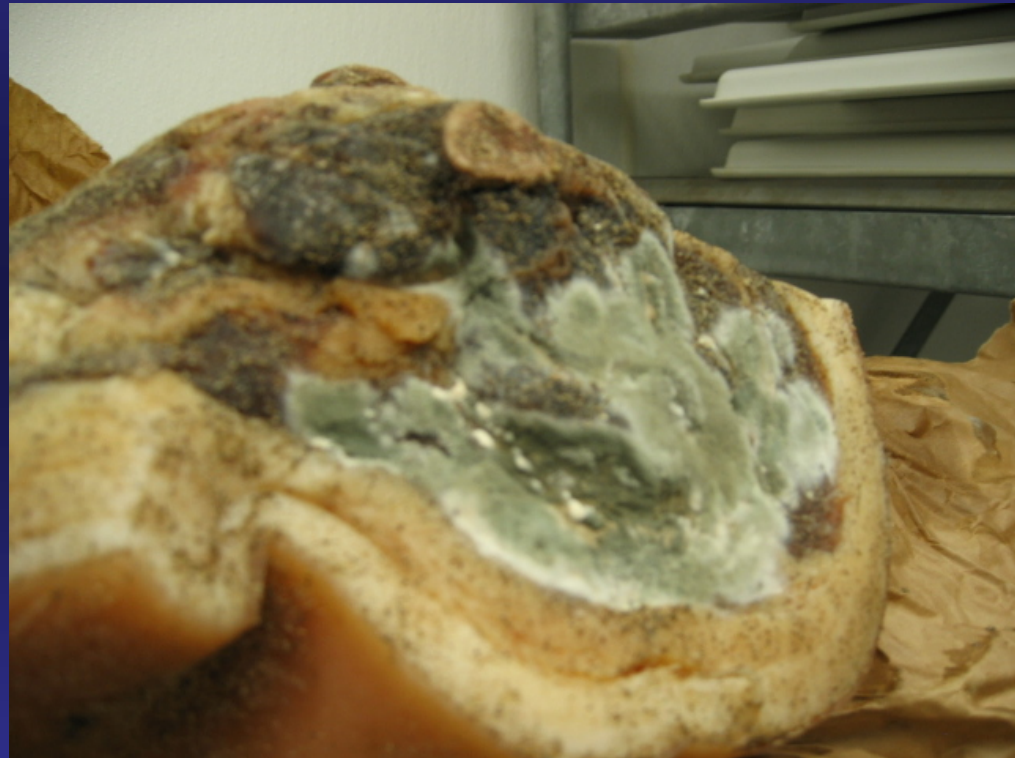
- To be labeled a Country Ham
- Must have lost 18% of its green weight
- Contain at least 4% salt





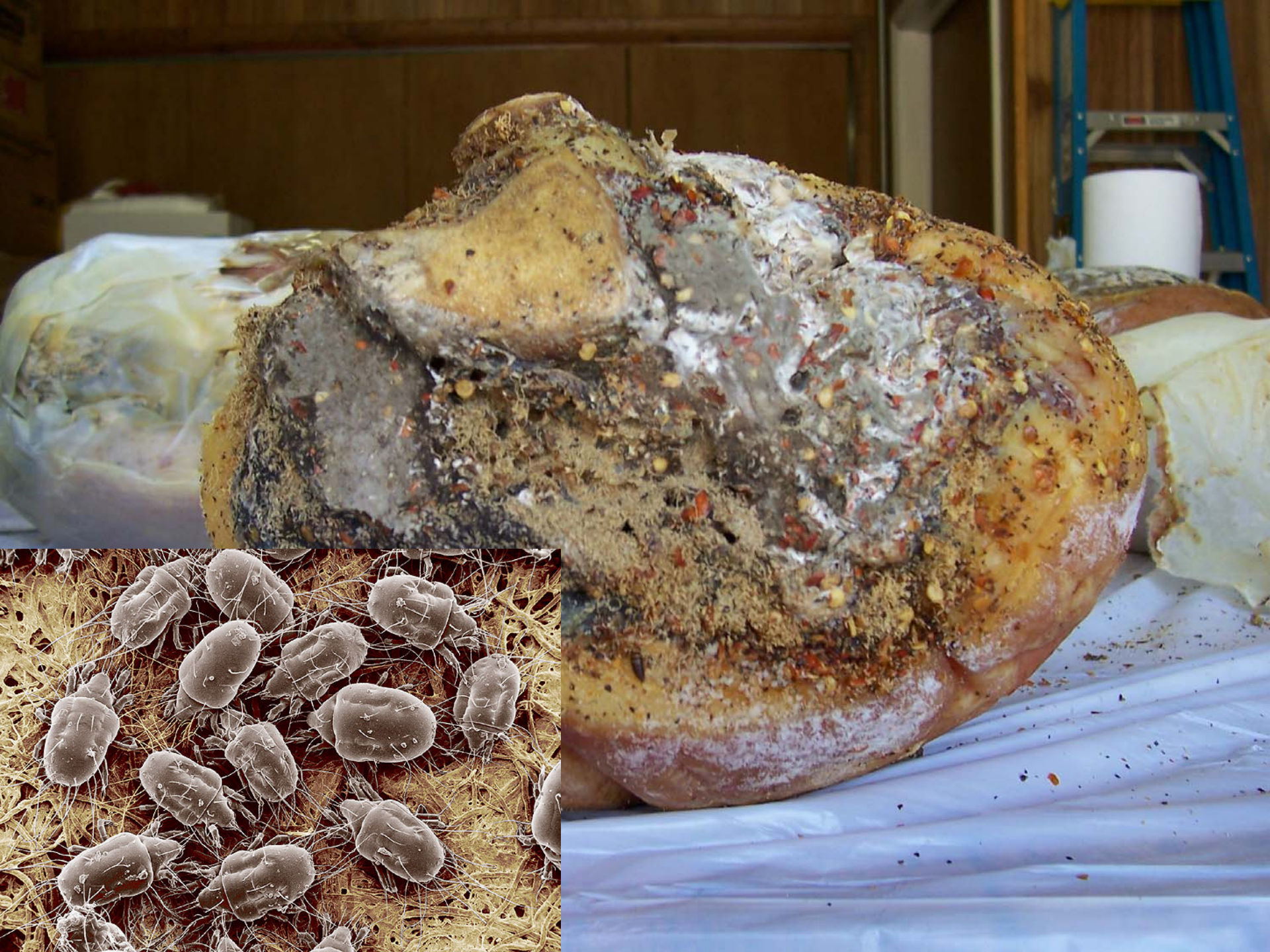
# Problems that occur

- **Mold Growth**
  - Common
  - *Penicillium*
- **Insect damage**
  - Larder Beetles, Red-legged Ham Beetles, Cheese Skippers, Ham Mites
- **Avoid PSE and DFD hams**
- **White specks – tyrosine**











# Question

- **Why is a country ham shelf stable?**



# Hurdle Technology

- A way of using several, effective preservation technologies to create safe, well preserved foods
- Add Salt
  - Effective bacteriostat and aids in water removal
- pH
  - Cannot get it low enough to create shelf stability
- Not vacuum packaged
- Water Activity ( $A_w$ )
  - Need to reduce the  $A_w$  enough to create shelf stability
  - Below 0.90

# Industry Averages

- Average
  - $A_w = 0.88$ 
    - Range 0.74 – 0.93
  - Salt content = 6.5%
    - Range 4 – 9.7%
  - $pH = 6.1$

