



Hams

- An American Icon
- 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**

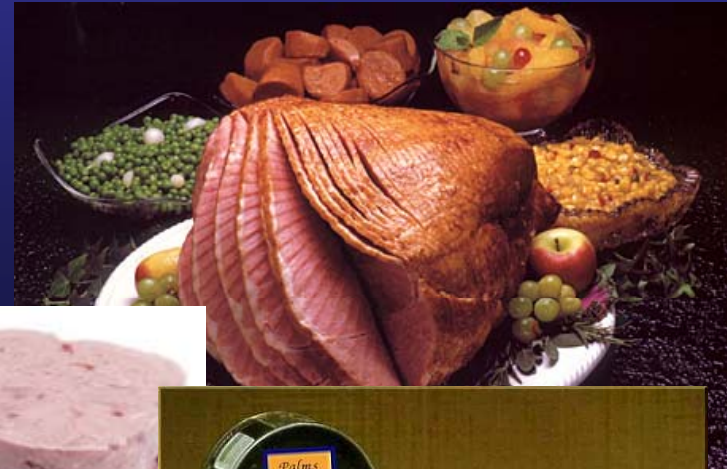


Types of Hams

- **Get what you pay for!!!**
- **Ham**
 - **20% Protein**
 - **No weight gain**
- **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



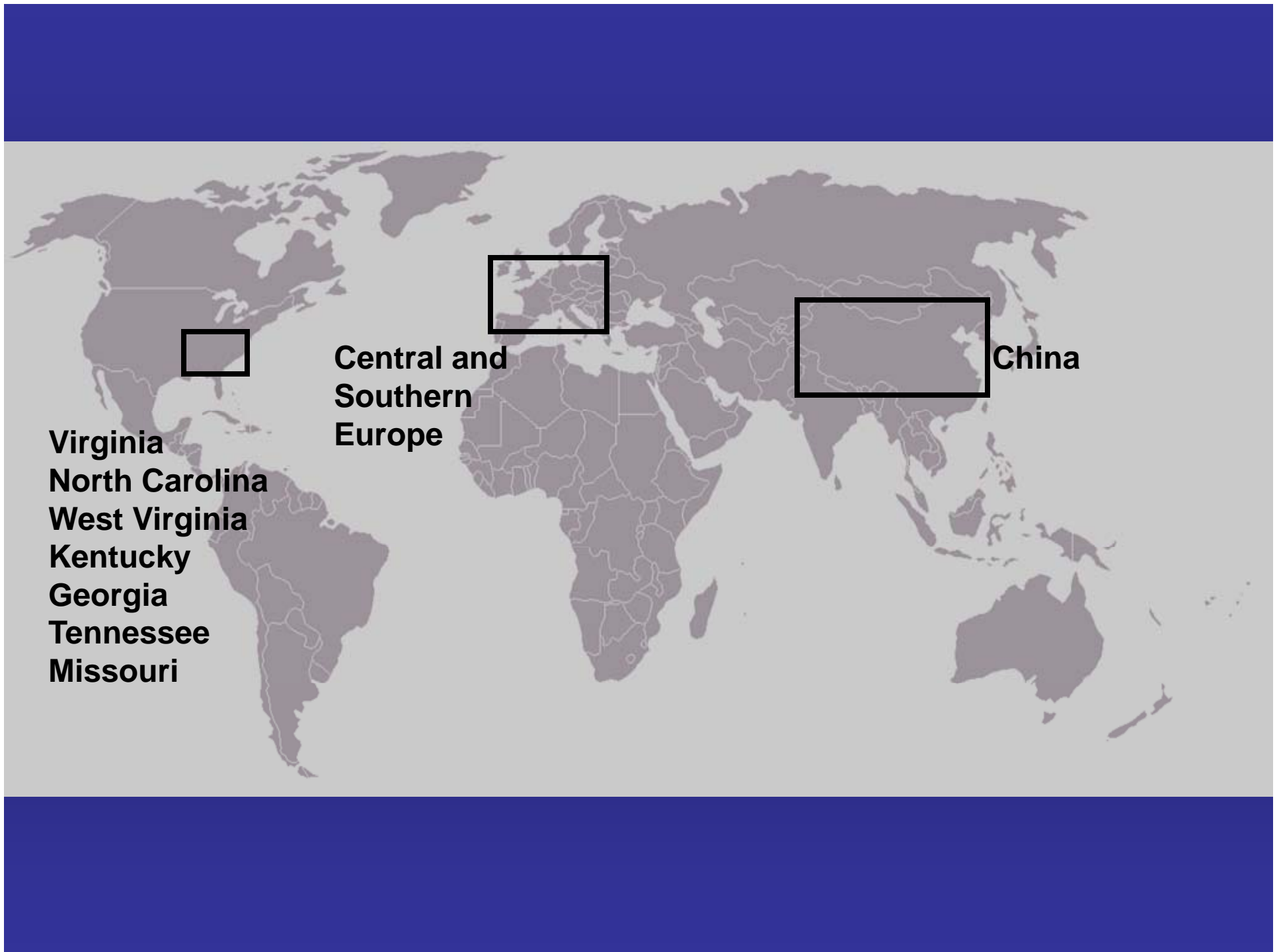
Country Ham

- 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

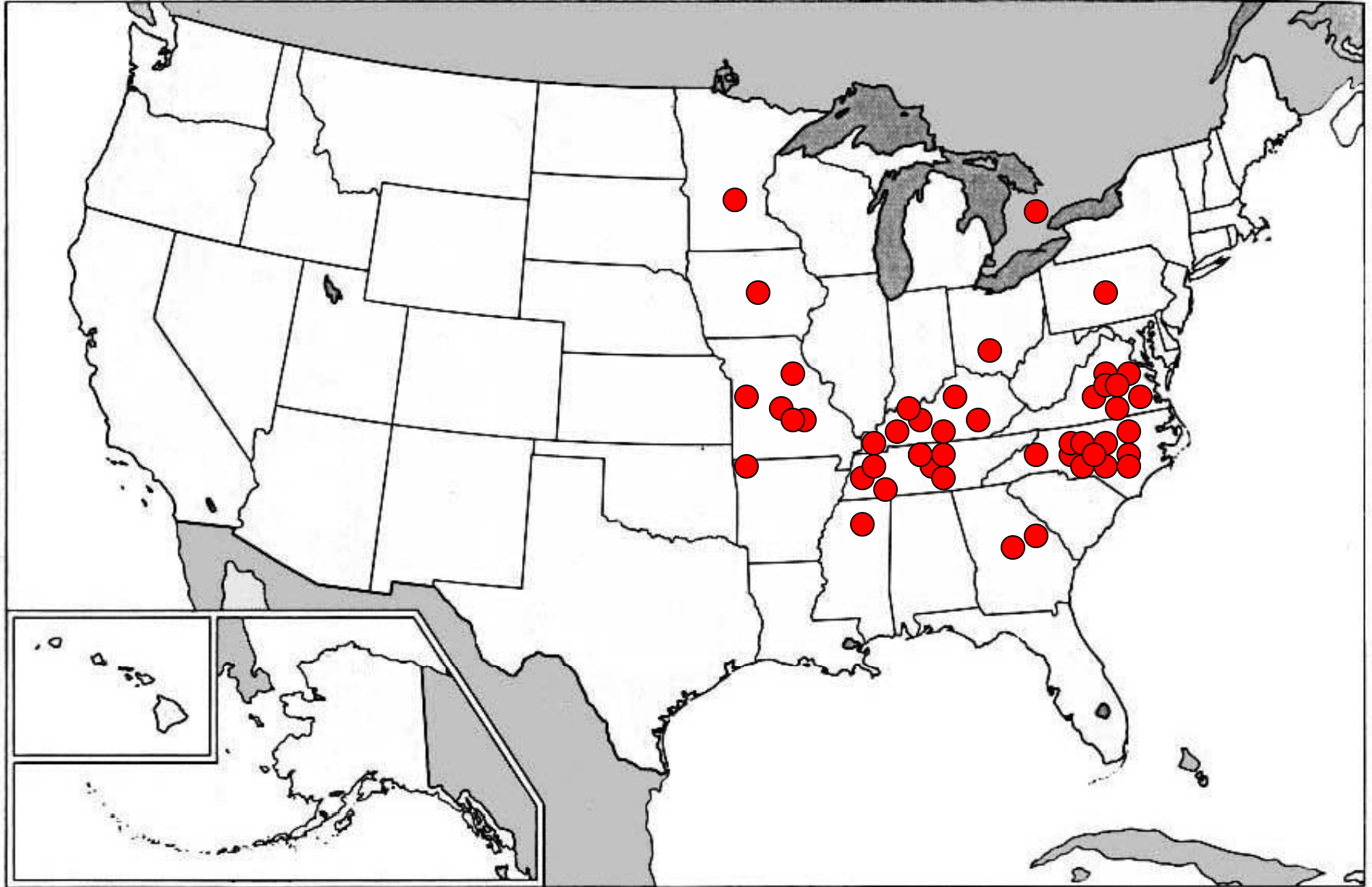
- Regions of the world where dry cured, country-type hams are produced
- Not all dry cured hams are called country hams
- These countries have climates that are optimal for the production of dry cured meats
- Mild winters and springs, hot humid summers



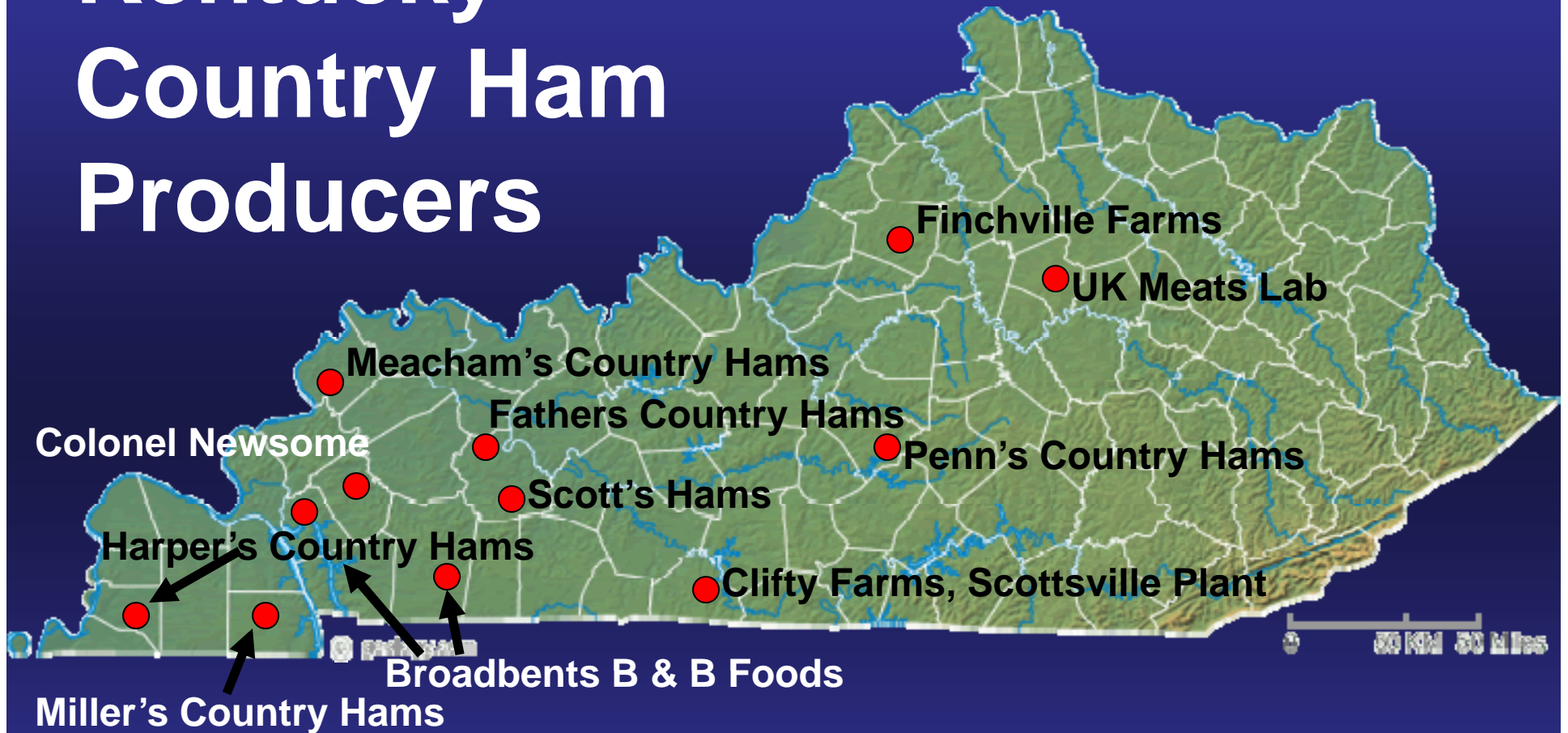
Virginia
North Carolina
West Virginia
Kentucky
Georgia
Tennessee
Missouri

**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





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



Culatello Ham



Spain

- Jamon Iberico Ham
 - Most expensive ham
 - 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

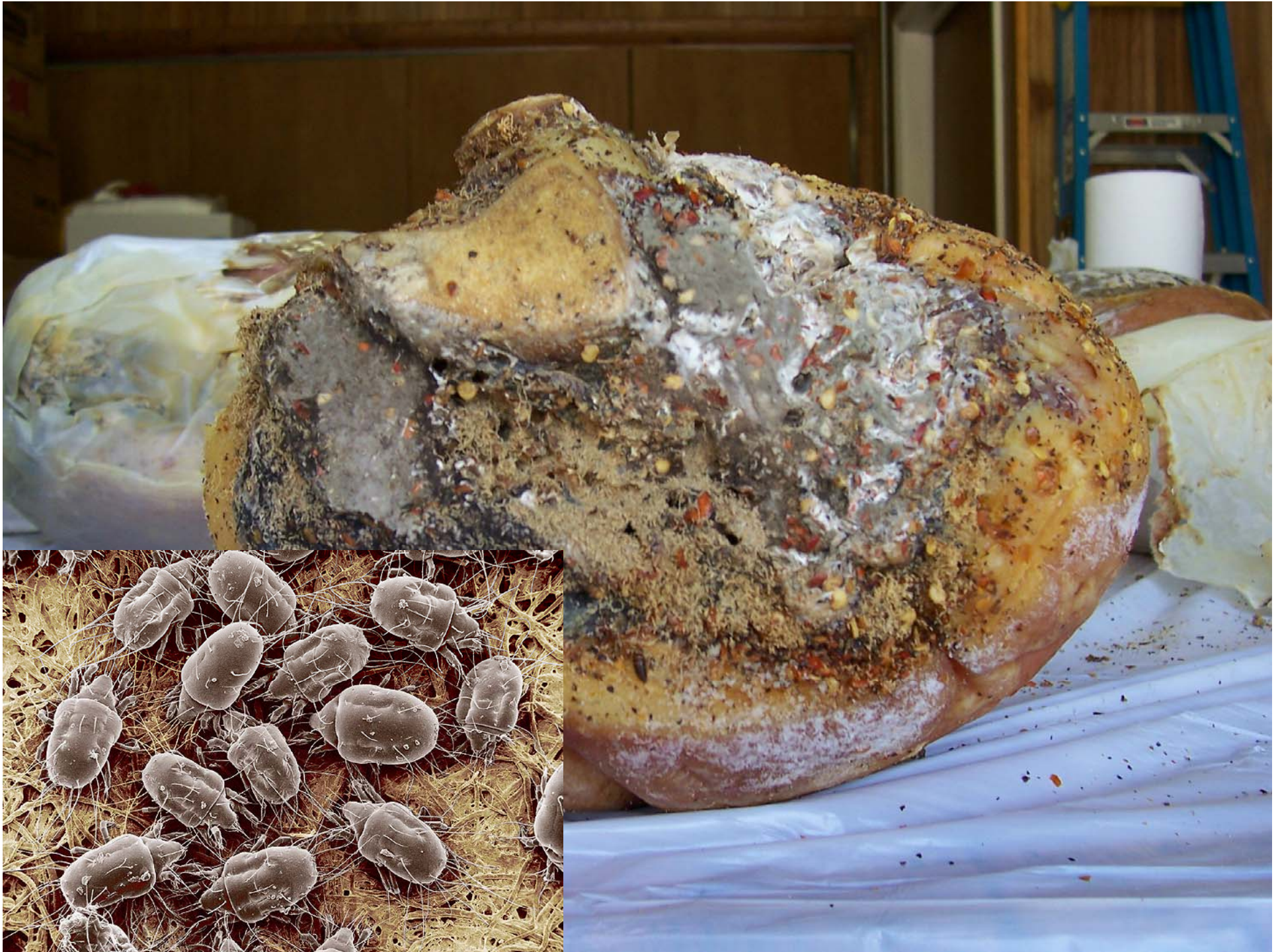


Problems that occur

- **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%
 - $pH = 6.1$

