

# **Bioterrorism and Food System Disruptions**

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**“The CDC List”**

**Category A  
“Special Action”**

- variola major**
- Bacillus anthracis**
- Yersinia pestis
- botulinum toxin
- Francisella tularensis
- filoviruses
  - Ebola
  - Marburg
- arenaviruses
  - lassa
  - junin



**Category B  
“Specific Enhancements”**

- pharviruses
- VEE, EEE, WEE
- ricin toxin
- Clostridium perfringens,  $\epsilon$  SEB
- Salmonella spp
- Shigella dysenteriae
- E. coli 0157:H7
- Vibrio cholerae
- Cryptosporidium parvum

**Category C  
“Future Threats”**

- nipah virus
- hantaviruses
- tickborne HFVs
- tickborne EVs
- yellow fever
- multidrug-resistant

**Khan, Morse, Lillibridge  
The Lancet, Vol 356, 20**

The outlier for agriculture....

## Foot & Mouth Disease

- Extremely contagious!
- Quite stable
- Low mortality
- Virus widely available
- Historically considered a weapon
- Susceptible population



# Naturally Occurring Food-borne Illness

- ~ 75 Million Illnesses
- More than 300 Thousand Hospitalizations
- ~ 5 Thousand Deaths
- A Cost of \$5-15 Billion per Year



# What Causes “Terror”?

- FMD in cattle.....Last in ‘29
- Emerging plant pathogen or pest...Relatively Common
- Botulinum toxin in human food.....Never large scale
- A zoonotic arbovirus.....WNV in ‘01



# Is it Natural or Manmade?

- Disease not typically occurring in area
- Arboviruses; may be difficult to differentiate
- Multifocal Outbreaks
- **Serial Outbreaks**



# Vulnerability of Animals and Crops

- Free access
- Constant movement
- Little physical security
- Isolated rural areas
- Trusting people
- Infrequently monitored
- Transient workers



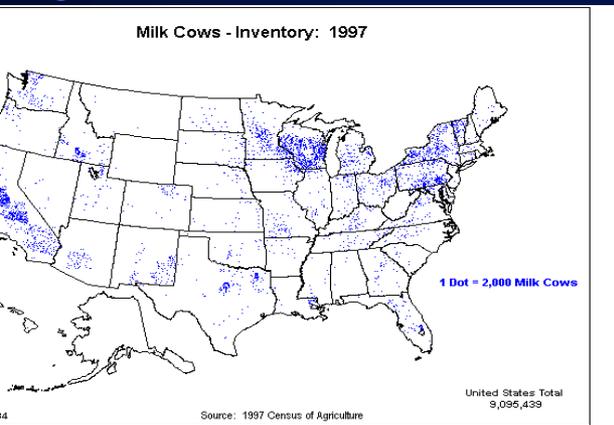
# Transported Widely

- Animals, Feed and Food
- Highways and Rail
- Unattended at Truck-stops
- Difficult to track movement

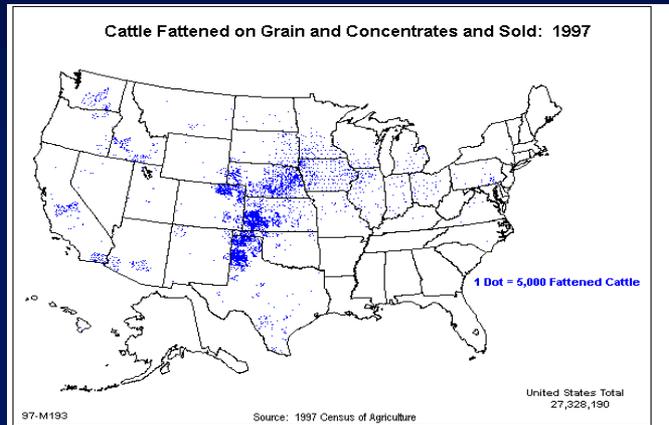


# Regional Concentrations Increase Vulnerability

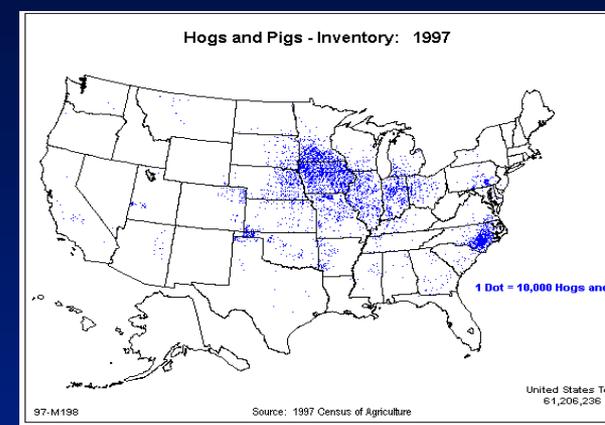
## Dairy



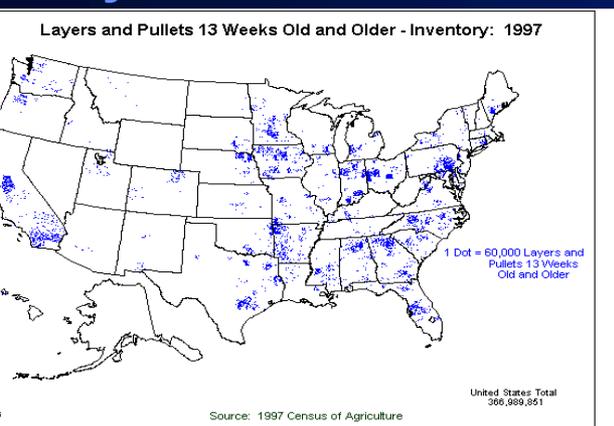
## Beef



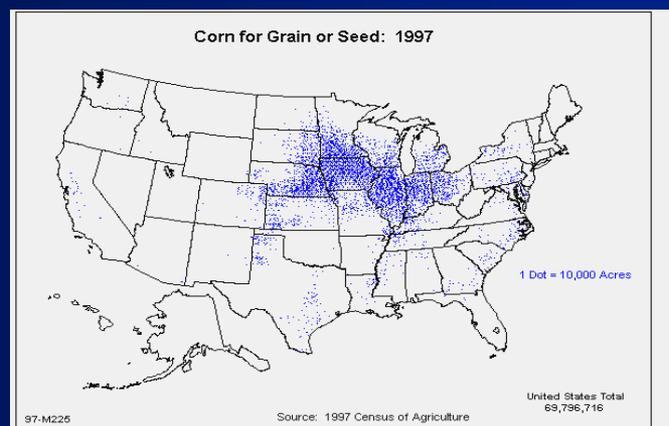
## Swine



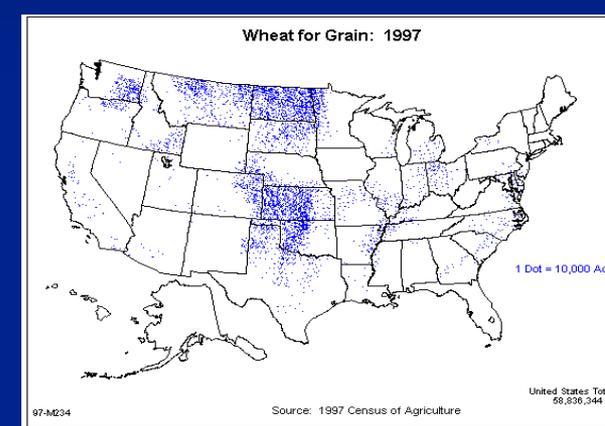
## Poultry



## Corn

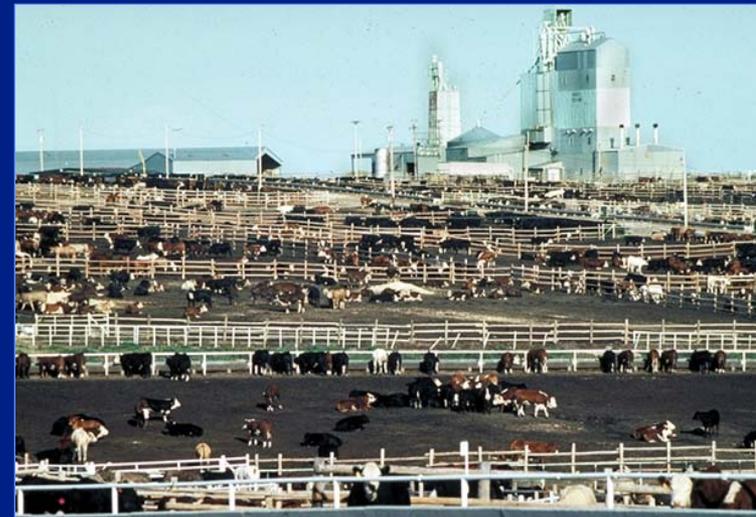


## Wheat



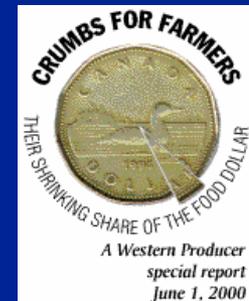
# Population Desensitizes

- Today in Texas, Kansas or Nebraska
  - 50 thousand head in a mid-sized feedlot
  - 500 semi-truck loads to packer
  - 280 semi- loads finished beef
  - 160,000 boxes of beef shipped to 50 countries



# Slim Profit Margins

- Agriculture not high-margin business
- Stiff domestic and foreign competition
- Land & equipment: major overhead costs
- **Prophylaxis and security add to overhead**
  - Unless risk is great---or measurable---can't afford
  
- Grain farmer ~ 1 cent / bottle of beer  
~ 5 cents / \$1 loaf of bread



# Direct National Impact on People

Unlike the anthrax letters, a major agricultural attack would become very personal to the masses very quickly.



# The Current Solution: Cull and Destroy

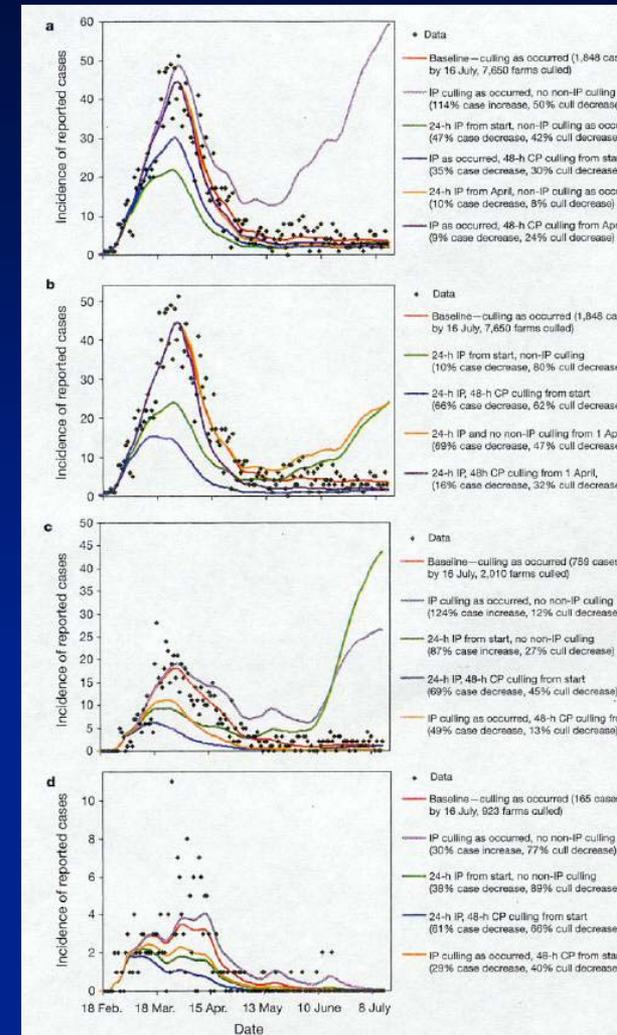
- 20-30 K tons + / feedlot
- Carcass disposal
- Decontamination
  - FMD (numbers)
  - BSE (difficulty)



# Importance of Early Identification

“...the epidemic could have been substantially reduced in scale had the most efficient control measures been rigorously applied earlier.”

- **Rapid, complete culling:**
  - Infected premises
  - Farms with dangerous contacts
  - Contagious premises
- **Movement restrictions and biosecurity**



# The Value of Awareness

- Most veterinarians not familiar with FADs
- “Dr. to patient ratio ” low
- Animals and plants seen by lay employees
- “Awareness” low-cost and effective



# The Way Ahead

- We're vulnerable
  - Close or reduce gaps
- Risk and threat???
  - HUMINT
- Not all "impacts" are equal
  - Prepare for the most important, feasible scenarios
- Exploit bio-, cyber- and electronic-technologies
- But don't ignore common sense solutions
  - Education, Physical Security and Early Diagnosis



# Priorities

- ID attack and confirm agent
- Develop case definition
- ID exposed animals or food products
- Control movement and animals and product
- Isolate and dispose of contaminated materials
- Vaccinate around outbreak, if possible
- Inform and educate the public