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Bioterrorism and Food System Disruptions

**USDA Agricultural Outlook Forum
25 February 2005**



David R. Franz, DVM, PhD
Midwest Research Institute
Kansas State University & The University of Alabama at Birmingham

“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”**

- phnaviruses
- VEE, EEE, WEE
- ricin toxin
- Clostridium perfringens, E
- 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



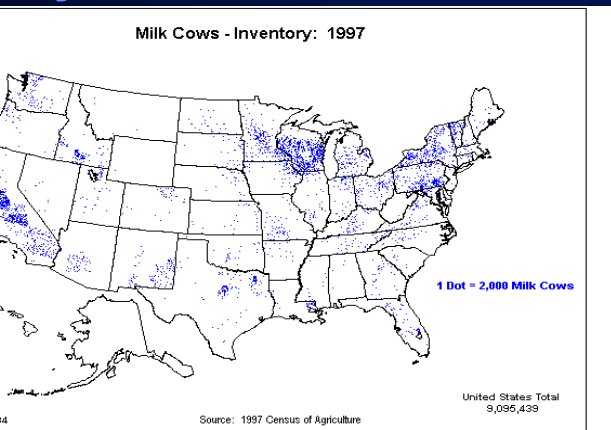
Transported Widely

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

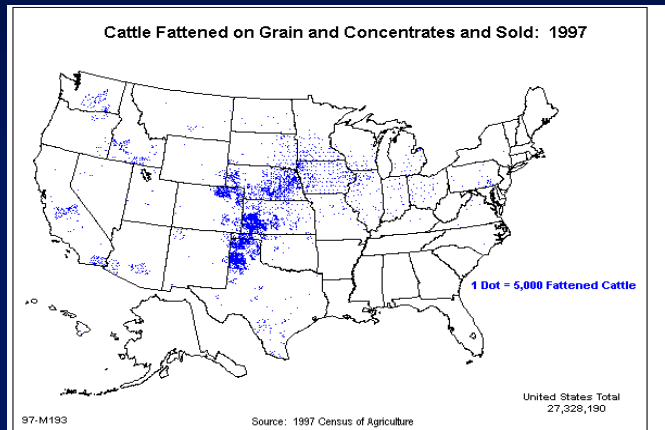


Regional Concentrations Increase Vulnerability

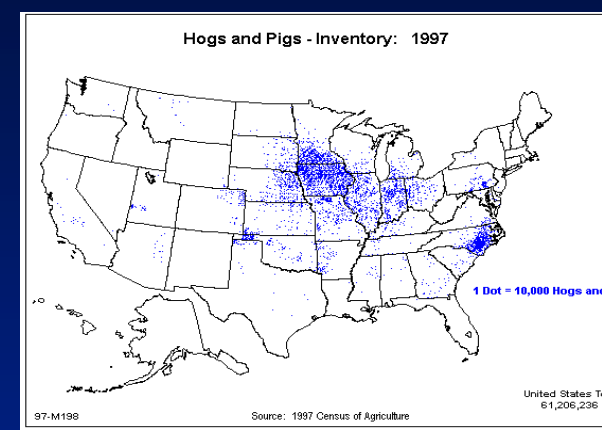
Dairy



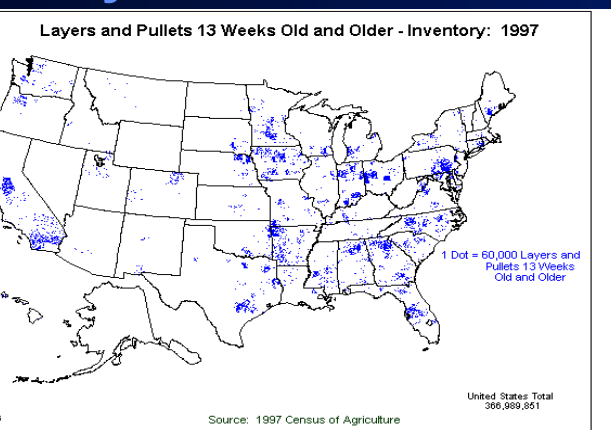
Beef



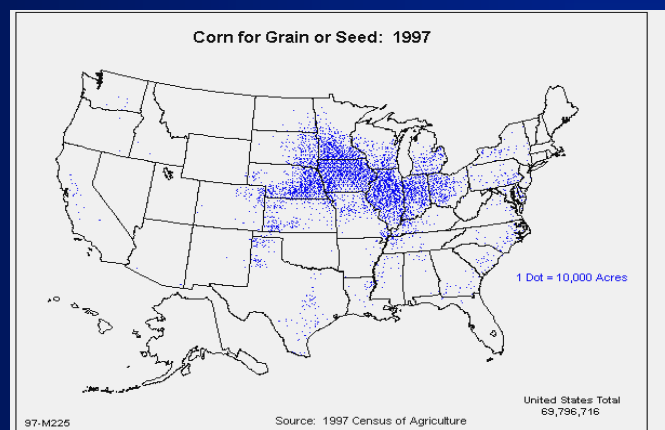
Swine



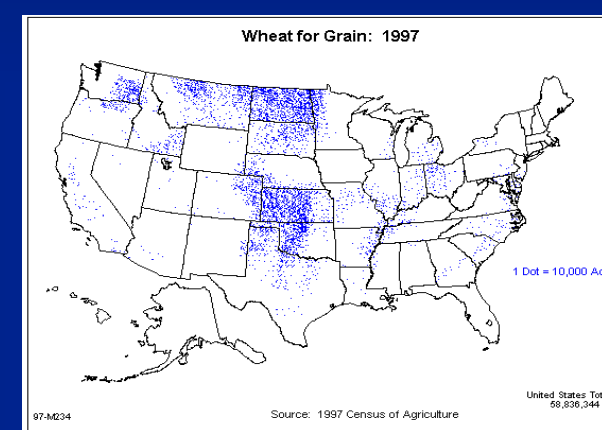
Poultry



Corn

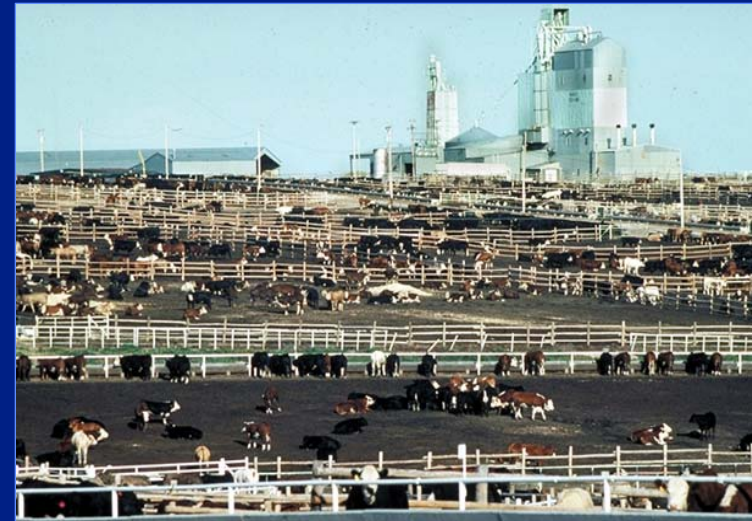


Wheat



Population Desensitizes

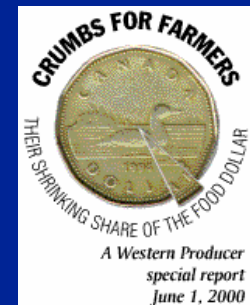
- Today in Texas, Kansas or Nebraska
 - 50 thousand head in a mid-sized feedlot
 - 500 semi-truck loads to packer
 - 280 semi- loads finished beef
 - 160,000 boxes of beef shipped to 50 countries



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

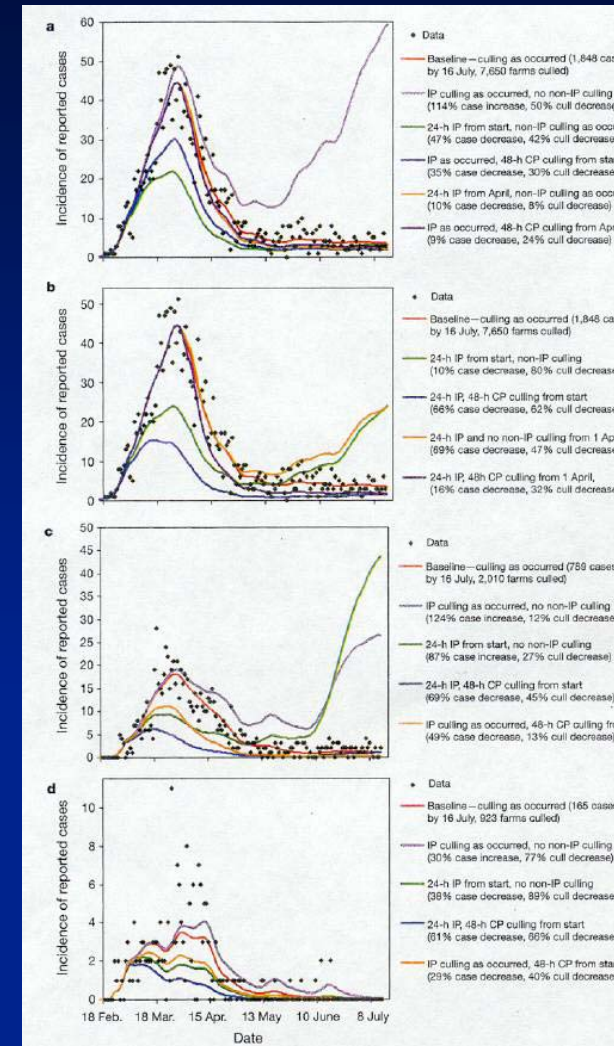
- 20-30 K tons + / feedlot
- Carcass disposal
- Decontamination
 - FMD (numbers)
 - BSE (difficulty)



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