

SELECT COMMITTEE ON KANSAS SECURITY

The meeting was called to order by Chairperson Lee Tafanelli at 1:20 p.m. on February 14, 2003 in Room 519-S of the Capitol.

All members were present except:

Representative Howell

Committee staff present:

Robert Walker, Legislative Research Department  
Bruce Cans, Office of the Revisor  
Carol Doel, Committee Secretary

Conferees appearing before the committee:

Dr. Jerry Jaax, Veterinarian and Assistant Vice  
Provost of Research and Compliance, Kansas State  
University

Dr. R.W. Trewyn, Vice Provost of Research and  
Compliance, Kansas State University

Others attending:

See Attached Sheet

Chairman Tafanelli recognized and thanked Justin Holston, Propane Marketers, for providing lunch for the committee members.

Chairman Tafanelli introduced Dr. Jerry Jaax, Veterinarian and Assistant Vice Provost of Research and Compliance, Kansas State University who gave a presentation on bio-terrorism and agri-terrorism. Dr. Jaax explained that he was a career Army officer who retired about four years ago after spending the bulk of his career in medical defense against chemical and biological agents. Dr. Jaax explained that our most powerful tools against infectious disease are containment, isolation and quarantine and are virtually useless in the event of biologic warfare. Biologic warfare is the intentional use of micro-organisms or toxins derived from living organisms to spread disease in humans, animals or plants. This requires the necessity of infrastructure and sophisticated science and funding. Bio-terrorism is the random use of bio-warfare agents. These are used to demoralize the country and exact revenge or effect policy. The good news is that we have heightened awareness; pre-positioned materials such as vaccines and treatments, better planning, coordination, communication and training; improved intelligence, security and surveillance; reinvigorating public health infrastructure; and government reorganization (Homeland Defense Department). For further information, Dr. Jaax recommended rating a book named *Germ*s by Miller, Engelberg and Broad ([Attachment 1](#))

Dr. Jaax stood for questions following his presentation.

The second presentation before the committee was given by Dr. R.W. Trewyn, Vice Provost for Research/Dean of the Graduate School, Kansas State University. In his presentation, Dr. Trewyn, related that KSU (Kansas State University) has established the NABC (National Agricultural Biosecurity Center) to expand ongoing efforts to protect America's vital agricultural infrastructure and economy from endemic and emerging biological threats. Protecting America's food supply and associated agricultural infrastructure from deliberate acts of bio-terrorism is of paramount importance to the U.S. and world economics. KSU recognized the threat to America's agricultural economy well in advance of September 11, 2001 and initiated a comprehensive Food Safety and Security (FS2) program to address the threat. ([Attachment 2](#))

Dr. Trewyn also provided to the committee the testimony presented to the US Senate's Emerging Threats Subcommittee in October of 1999 entitled **AGRICULTURAL, BIOLOGICAL WEAPONS THREAT, FOOD SAFETY, SECURITY, AND EMERGENCY PREPAREDNESS**, Kansas State University, Jon Wefald, President. ([Attachment 3](#))

Dr. Trewyn stood for questions from the committee.

With no further business, Chairman Tafanelli adjourned the meeting at 3:10 p.m.


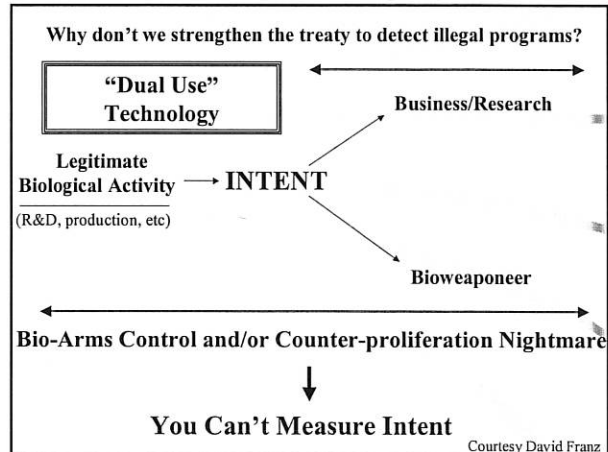


### Why did the Bioweaponers pick the Zoonotics?


- Not Highly Contagious - less likely to get away
- Many strains or isolates readily available in nature
- Diseases relatively well understood
- Animal models available for virulence and counter-measures testing
- Animals as "production vessels"
- Legitimate reason to work with the agents

"Most of the U.S. agents made you want to die"

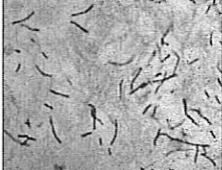
Bill Patrick - former head of U.S. bioweapons production


### The risk is agent, target, and delivery dependent





Foot and Mouth Disease




*Bacillus anthracis*



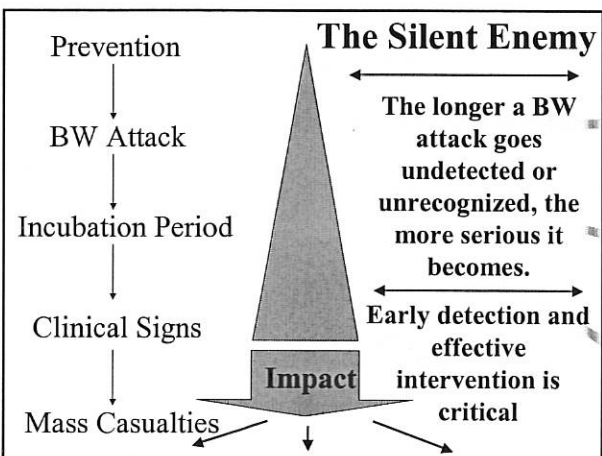
*Variola major*




USPS Doing Everything Possible To Protect Mail

### The Risk is Agent, Target, and Delivery Dependent



### Emerging or Intentional Disease Event



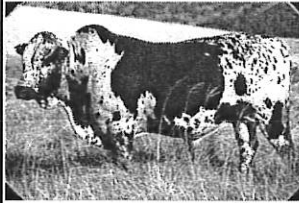
Dick and Jane from Kansas City just returned from travel in the UK and introduced Foot and Mouth Disease into the massive food animal economy of the United States.

**Was this an innocent mistake?**

**Or were they Terrorists intent on damaging the U.S.?**

Select Committee on Kansas Security  
Attachment 1-1  
Date 2-14-03

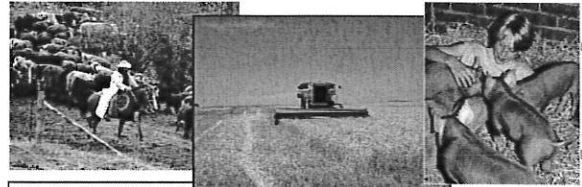
## Why Agricultural Targets ??



← Agricultural bioterrorism is not about someone trying to kill cows →

It would be an economic assault on our national security and infrastructure

## The Great Engine of Our Prosperity



...Our ability to produce safe, plentiful, and inexpensive food creates the discretionary spending that drives the American standard of living....

Dr. John Wefald  
President KSU

### Agricultural Bio-terrorist Threat

Anti-agricultural agents have been a staple of State-Sponsored BW programs for many decades

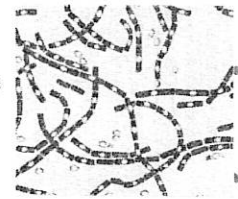
- U.S. developed agricultural biological agents prior to dismantlement of offensive BW program (1969)
- Britain did extensive anticrop research in the 40's-60's
- USSR developed significant capability for producing plant and animal pathogens
- Iraq worked with wheat pathogens, camel pox, etc



- Wheat Stem Rust
- Rice Blast
- Glanders
- Pathogenic plant fungi
- Etc.

According to the congressionally mandated panel - the Gilmore Commission:

"[A] concerted biological attack against an agricultural target offers terrorists a virtually risk-free form of assault, which has a high probability of success."



← This is important as one of the main factors that appears to have limited terrorist experimentation with WMD is a lack of predictability: the perceived ability to carry out the operation in question with minimal risk to the terrorists themselves. →

Jane's Security News  
9 Feb 2001

"Russian scientists had repeatedly warned the (Clinton) administration that Iranian officials were hunting for experts, particularly those with recombinant skills involving plant and animal pathogens"

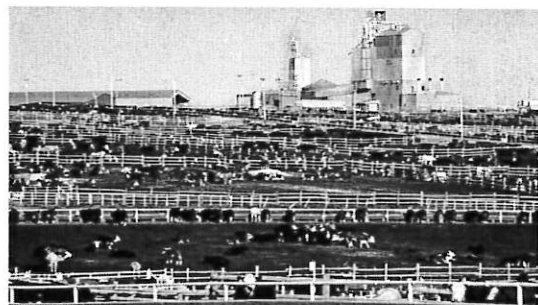
"Germs"

Miller, Engelberg, Broad

← Warnings from the FSU about recruitment of former biowarriors into countries where clandestine offensive BW programs are thought to exist →

10K of the 60K scientists and technicians in the Soviet Union involved in offensive BW programs were involved in activities with agricultural pathogens

Ken Alibek to Dr. Linda Logan



## Pokrov

- Russian Agri BW R&D facility
- 2 FMD production lines capable of producing 12 metric tons of FMD virus per production run.
- 5 nuclear-hardened bunkers (agricultural vaccines???)
- Production capabilities of 200 tons of smallpox virus / year
- Security = One night watchman and a German Shepard dog



## Agricultural Biological Threat

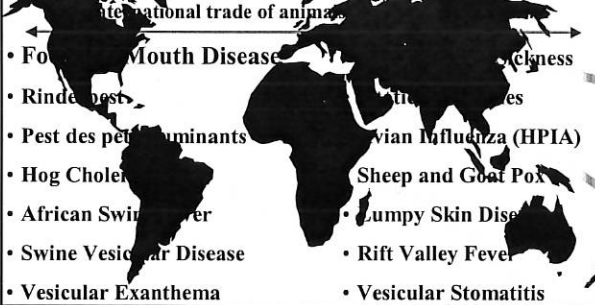
### Why the Food or Water Supply?

- Lower Tech
- Lower Profile for Detection
- Personal Safety
- Easier and Safer Delivery
- Lower Retaliatory Risk
- Plausible Deniability
- Reduced Moral and Ethical Burden

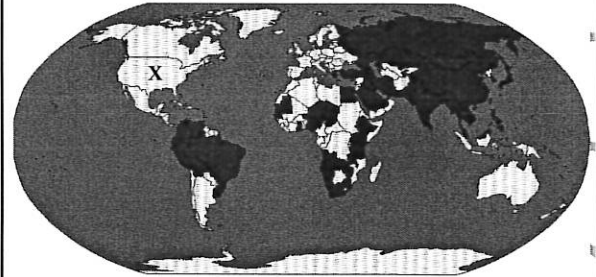


Transmissible diseases with potential for very serious and rapid spread, irrespective of national borders, that are of serious socio-economic or public health consequence and major importance to international trade of animals

- Foot and Mouth Disease
- Rinderpest
- Pest des petits ruminants
- Hog Cholera
- African Swine Fever
- Swine Vesicular Disease
- Vesicular Exanthema
- Newcastle Disease
- Avian Influenza (HPAI)
- Sheep and Goat Pox
- Lumpy Skin Disease
- Rift Valley Fever
- Vesicular Stomatitis



## FMD outbreaks 2000



Economists predict immediate loss of billions!!

USA Today, 29 March 2001: "If foot-and-mouth disease hit the vast expanse of farmlands of central California, it could mean the destruction of more than 800,000 animals and financial losses of \$14 billion in a matter of weeks, researchers predict"



Lovell Jarvis,  
University of California-Davis.

The current FMD scenario has provided us with an unprecedented opportunity to prepare. We can't expect to always be forewarned

## The Numbers for FMD in the United Kingdom

- 11 months to control outbreak
- 2030 FMD cases
- 10,000 separate livestock operations affected
- 4,000,000 million animals slaughtered
- £ 25,000,000,000 loss to economy

Does not factor in the devastating emotional and psychological trauma



## Where's the Beef

Today, the Big 4 packing plants in SW Kansas will slaughter 22,000 head of cattle!



Information Courtesy of James Lane, Undersheriff of Ford County, KS

## The Big Numbers of AgriBusiness

For a 50,000 head (mid-size) feed yard:

- The yard may turn over its capacity 3 times annually.
- Animals will consume 24,000 tons of alfalfa
- 4 feed trucks run non stop 12 hours a day.
- Will receive cattle from all over the U.S. and Mexico



Courtesy James Lane

EVERYDAY, within 150 miles in SW Kansas:

- 500 semi loads of live cattle arrive at the packers
- 280 semi loads of finished beef product leaves the plants
- 160,000 boxes of finished beef product are shipped to 50 countries throughout the world.



Courtesy James Lane

## The Big Numbers of AgriBusiness

- The majority of grain raised in southwest Kansas is used to feed cattle in the area...
- One local feed yard purchased just over 5 million bushels of corn from local producers last year.
- Just over 9,240 semi loads of feed commodities were purchased to maintain animals in this yard



Courtesy James Lane

### Cattle Inventory

#1	Texas	13.6 M
#2	Kansas	6.6 M
#3	Nebraska	6.40 M
#4	Oklahoma	5.20 M
#5	Missouri	4.35 M



### Cattle Processing

#1	Nebraska	7.67 M
#2	Kansas	7.27 M
#3	Texas	6.46 M

Source: USDA/NASS

## Potential Impacts of a Major Attack on Agriculture or the Food Chain


- Mass Economic Destabilization
  - Direct economic losses from counter-measures
  - Compensation costs to farmers and for destruction of materials
  - International costs of trade/export embargos
- Loss of Support for and Confidence in Government
  - Public suspicion of the safety of food supply
  - Disposal issues
  - Information age coverage
- Social Instability
  - Mass panic (especially zoonotics)

Peter Chalk,  
Rand Corporation

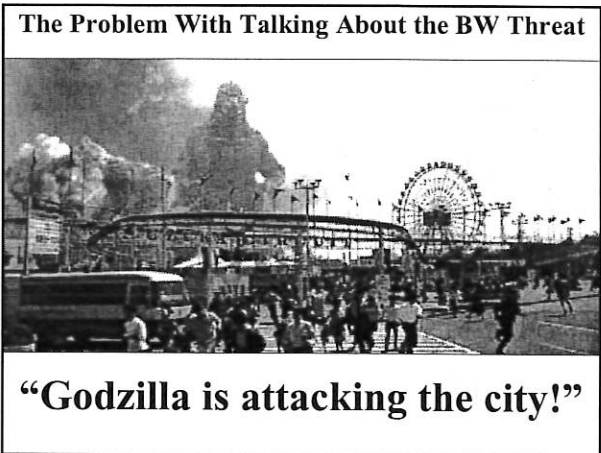
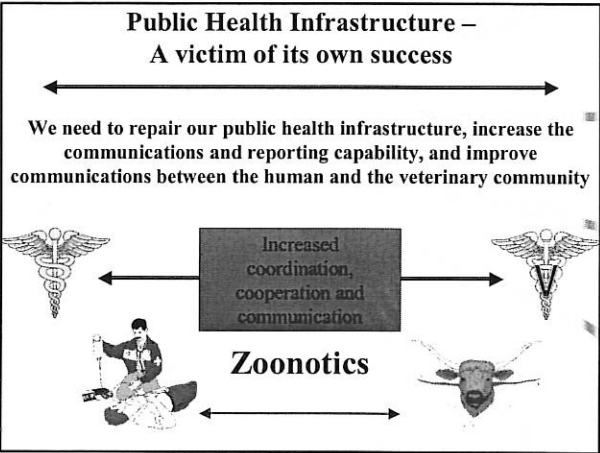
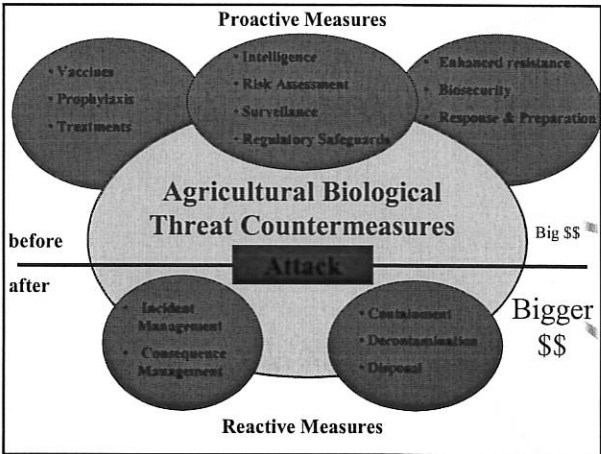
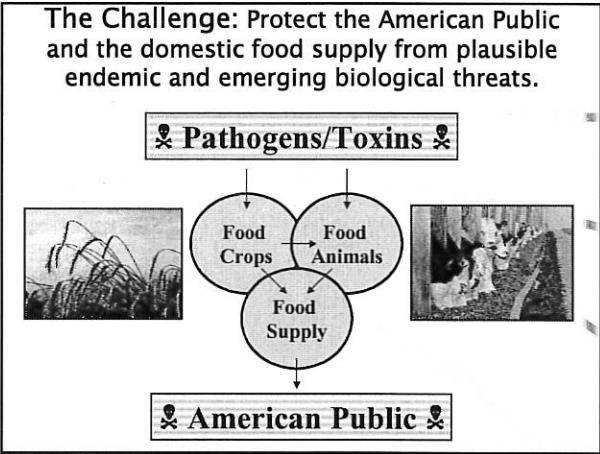
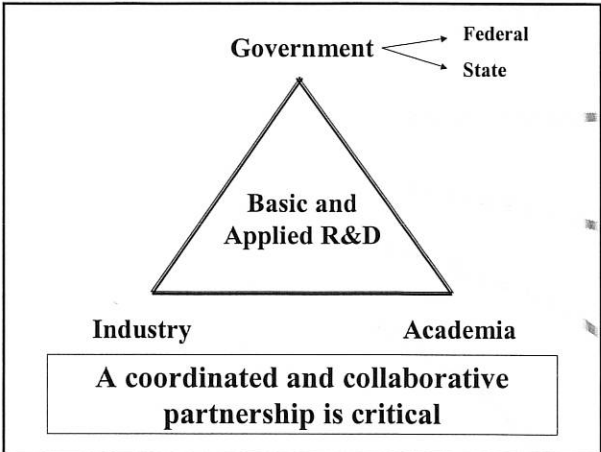
**How are we going to counter these new and ominous threats to our national security, our people, or our economic infrastructure**

**We must Improve and Refine Traditional Countermeasures to potential emerging Public Health Threats**

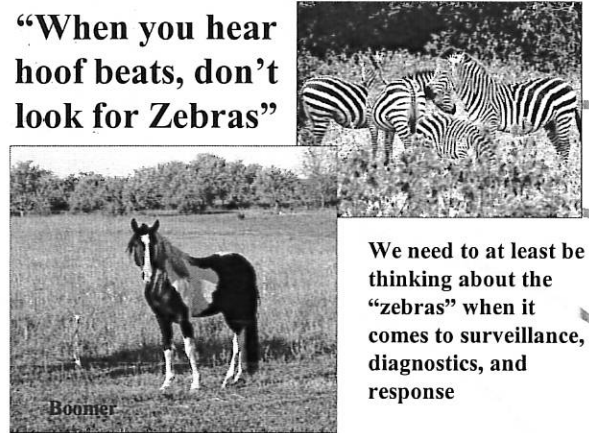
- Intelligence / Communication
- Vaccines, Prophylaxis, Treatments
- Surveillance
- Genetic enhancement of resistance
- Rapid diagnostic capabilities
- Rapid - Incident Response
- Consequence Management
- Enhance Surge Capacity
- Training
- Increase Bio-security Profile



**Virtually all are dependent upon facilities and personnel**



**“When you hear hoof beats, don’t look for Zebras”**

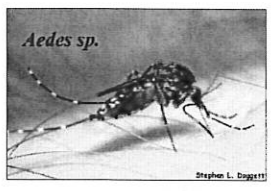


We need to at least be thinking about the “zebras” when it comes to surveillance, diagnostics, and response

**West Nile Virus**

Mosquito-borne viral disease causing encephalitis and death in :

- Humans
- Horses
- Birds
- Swine
- Many other species



←—————→

- **Public Health Communications disconnects**
- **Doesn’t have to be “Outbreak”**
- **What If ???**                      **Or Who’s to Say!!!**

**The Good News**

- Heightened Awareness
- Accelerated / Applied Research
  - Rapid Diagnostics
  - First Response capabilities
  - Countermeasures (vaccines, treatments, containment strategies)
  - New Facilities
- Pre-positioned materials/teams (vaccines, treatments, PPE)
- Better Planning, Coordination, Communication and Training
- Improved Intelligence, Security and Surveillance
- Reinvigorating Public Health Infrastructure
- Government Reorganization (Homeland Defense Dept)



**The Bad News**

←—————→

**“After successful prevention, the next line of defense is the development of new vaccines and antidotes for bioterror”**

←—————→



**“The Defense Science Board estimates that we have only 1 of 57 needed antidotes or vaccines is available for the top 19 bioterror threats”**

←—————→

Christian Science Monitor  
11 Feb 2003

**'Better to be scared by the improbable possibility, than to be unprepared for the catastrophic reality'.**

Congressman Christopher Shays (R-CT),  
Chairman of the Subcommittee on National Security,  
Veterans Affairs, and International Relations

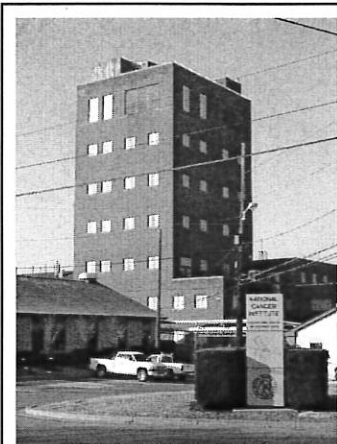



The geopolitical reality is that the U.S. is vulnerable to biological assault, be it naturally occurring, or intentional.

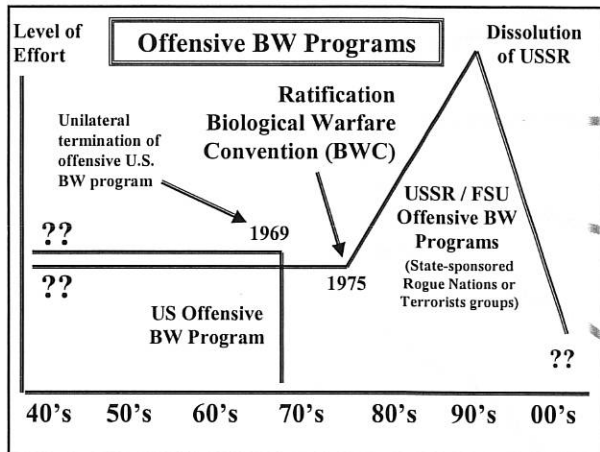
←—————→

**A judicious and focused investment in critically needed R&D and public health facilities and capabilities is a prudent investment in our national health and security**





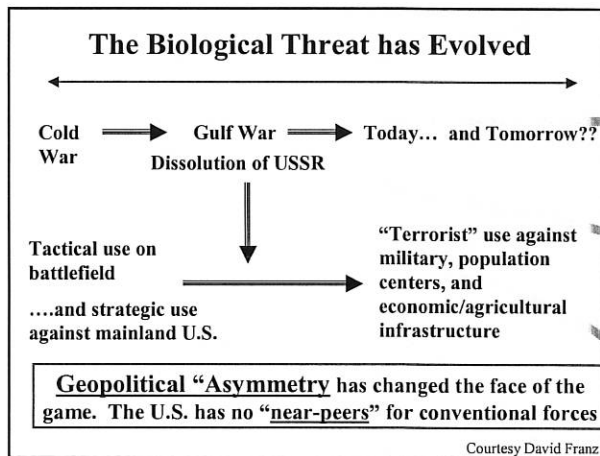
**Building 870 - The Anthrax Pilot Plant Ft. Detrick MD**



Sept 11, 2001

**The Paradigm Shift**

A new understanding that there are people with the will, and the means to inflict mass casualties on targets in the U.S.



**Diseases often mentioned in the context of Biological Warfare**

<p><b>Human Diseases</b></p> <ul style="list-style-type: none"> <li>• Smallpox</li> <li>• Cholera</li> <li>• Shigellosis</li> </ul>	<p><b>Zoonoses</b></p> <ul style="list-style-type: none"> <li>• Anthrax</li> <li>• Brucellosis</li> <li>• Coccidioidomycosis</li> <li>• VEE/EEE/WEE</li> <li>• Marburg/Ebola</li> <li>• Histoplasmosis</li> <li>• Rift Valley fever</li> </ul>	<p><b>Animal Diseases</b></p> <ul style="list-style-type: none"> <li>• African Swine Fever</li> <li>• ** Foot &amp; Mouth</li> <li>• Fowl plague</li> <li>• Newcastle</li> <li>• Rinderpest</li> </ul>
<p><b>Toxins</b></p> <ul style="list-style-type: none"> <li>• Botulism</li> <li>• SEB</li> </ul>	<p><b>Plant Diseases</b></p> <ul style="list-style-type: none"> <li>• Wheat Stem Rust</li> <li>• Rice Blast</li> <li>• Pathogenic Plant Fungi</li> <li>• Karnal Bunt</li> </ul>	

Courtesy David Franz

**"Category A" agents**

• Pose a significant risk to national security because:

- easily transmitted from person to person
- high mortality
- require special efforts to ensure preparedness

**80% of "Category A" agents are zoonotic**

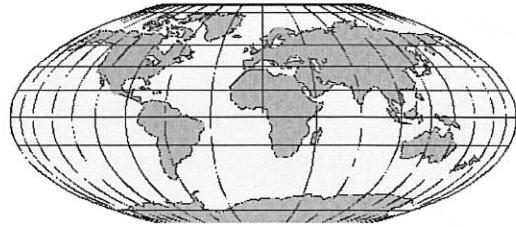
## The Agroterrorist Threat: A Real Possibility?



Legislative Security Committee  
14 February 2003

Jerry Jaax  
Associate Vice Provost for Research Compliance  
and University Veterinarian  
Kansas State University

It is a complicated world -  
and it is shrinking every day



## Biological Warfare

The intentional use of micro-organisms  
or toxins derived from living organisms  
to produce death or disease in humans,  
animals and plants

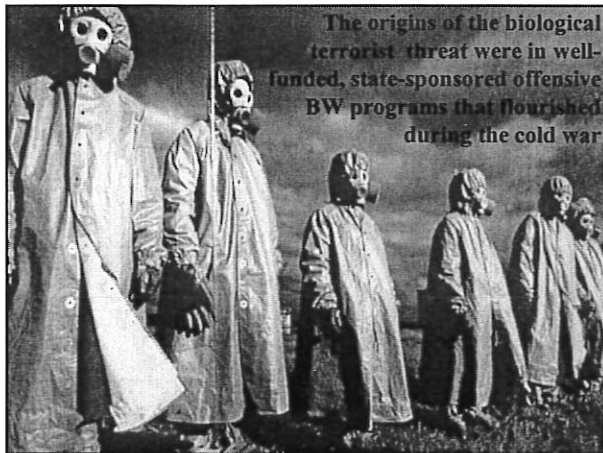
Bio-terrorism is  
the random use of  
these weapons  
against the public



With the purpose  
of demoralizing a  
country, exacting  
revenge, and /or  
affecting policy

History has provided us with many  
examples of use of biological weapons.

- Sythian arrows dipped in blood of decomposing bodies (400 BC)
- Diseased bodies in water supplies
- Saliva from rabid dogs in artillery shells (Poland, 1650)
- Smallpox infected clothing or blankets
- Nomadic Mongols catapult bubonic plague-infested bodies into the Genoese trading post in the Crimea.
- Japanese Imperial Units 731 and 100



The origins of the biological  
terrorist threat were in well-  
funded, state-sponsored offensive  
BW programs that flourished  
during the cold war

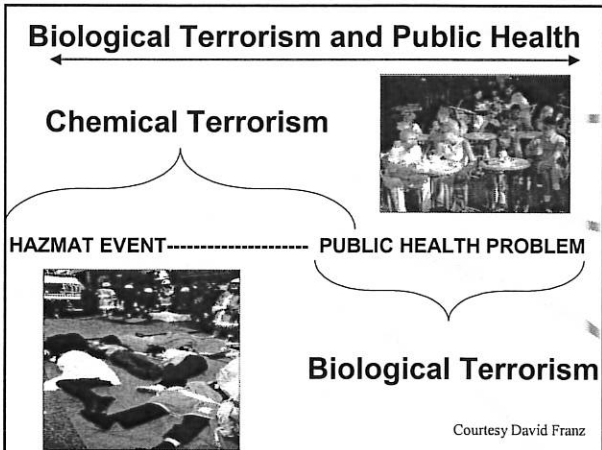
## The Biological Threat

There are a number of countries  
suspected to be in violation of the  
Biological Warfare Convention (BWC)



Iraq	Russia
Syria	North Korea
Libya	South Africa
Cuba	Iran
.....	.....





### Implications and Constraints for the Bioweaponer

- Must be presented as a respirable aerosol

*Therefore*

- Preparation and weaponization may jeopardize viability
- Aerosols are dependant on meteorological conditions

*However...*

- Contagious agents can be delivered without weaponization
- Some agents can be spread by vectors

Courtesy David Franz

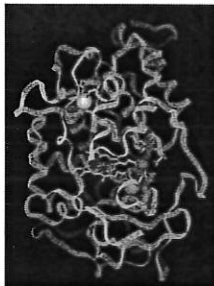
### Biodefense is the "single most significant modern challenge to U.S. sovereignty"

- "biological weapons can be delivered by a few"
- present a small signature for which the U.S. has ill-developed intelligence gathering capability
- conventional concepts of deterrence are not necessarily effective
- the nation has a limited response capability to contain the consequences."

Defense Science Board  
July 2002



### The Dark Side of Biotechnology




"Biology is about to lose its innocence in a profound way. While physics dominated weapons in the 20th century, biology will dominate weapons in the 21st"

George Poste  
Defense Science Board

- "Constructed" polio virus
- Mouse Pox "super virus"

### Prudence or Paranoia???

- Camelpoxvirus is the causative agent of **Camelpox**
- Causes Pox disease in dromedary camels - Africa and Asia
- Iraqi BW lab with genetic engineering capability admittedly worked with the agent




- Primary human pathogen in non-endemic areas??
- Genetic modification as BW agent??
- Lab surrogate for variola??
- Worried about camels???

Soldiers reportedly have smallpox titers

### Biowarfare in the Former Soviet Union

- Dr. Ken Alibekov - Biopreparat
  - Defected from the FSU - wrote "Biohazard"
  - Defined the scope of the FSU bio programs
    - 60K scientists and technicians
    - Program and facilities secret and dispersed
  - Strategic as well as Tactical Doctrine

Potential proliferation of expertise, technology, agents



## The Crux of the Proliferation Problem

**"If you are not financially independent, it influences your moral decision-making."**

Daan Goosen, former managing director of Roodeplaat Research Laboratories (RRL) in South Africa



## Russian MOD Offensive BW Programs Still Viable?

- At least 4 suspected MOD BW facilities remain "top secret" and "off limits" to western scientists
  - Kirov
  - Yekaterinburg (Sverdlosk)
  - Saint Petersburg (Leningrad)
  - Sergiev Posad
- Concern about possible new classes of agents
  - Chimeras
  - Bioregulators
  - Engineered vaccine or treatment resistance



"We stockpiled hundreds of tons of anthrax and dozens of tons of plague and smallpox near Moscow and other Russian cities for use against the United States and its allies"

Soviet defector Colonel Kanatjan Alibekov, MD  
Biopreparat's deputy chief (1992)

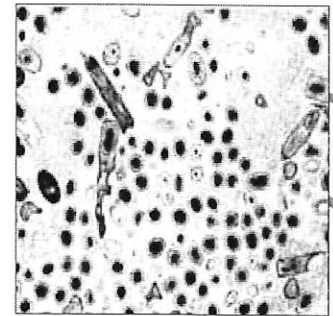
Alibek predicts in "Biohazard" that the threat of biological attack has actually increased as techniques developed in the USSR have "spread to rogue regimes and terrorist groups . . . they are cheap, easy to make and easy to use."



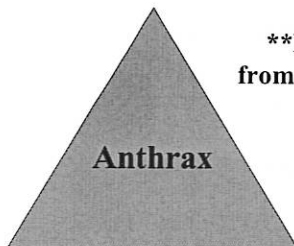
One gram, or one twenty-eighth of an ounce, high-grade anthrax can hold up to 100 billion spores. Estimated conservatively, at 10,000 spores to a lethal dose, one gram in theory could cause about 10 million deaths

Ken Alibek

**Anthrax Spores**



**Pulmonary (aerosol) 80%**



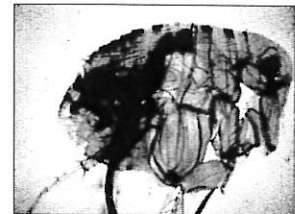
**\*\*Not contagious from one individual to the other**

**Cutaneous (contact) 20%**

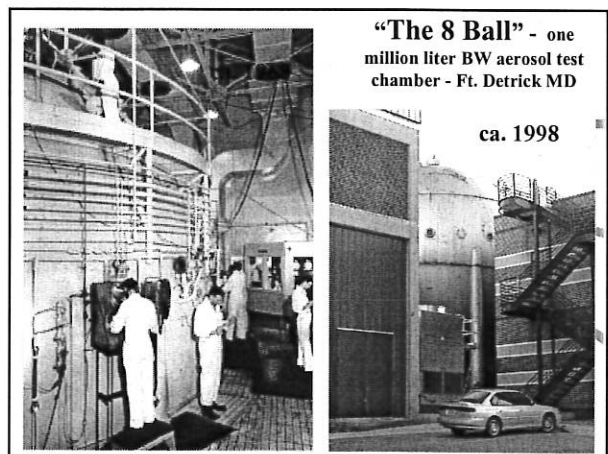
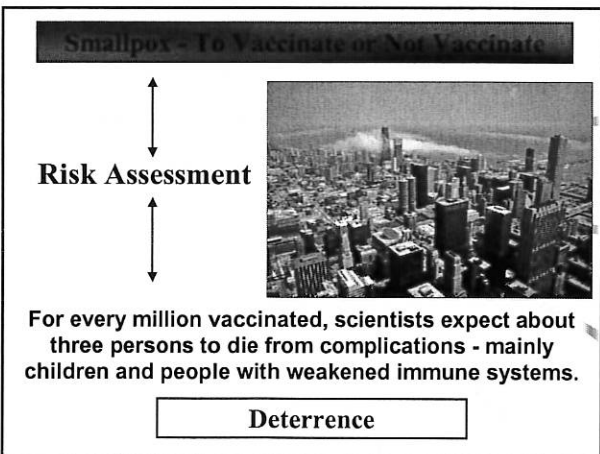
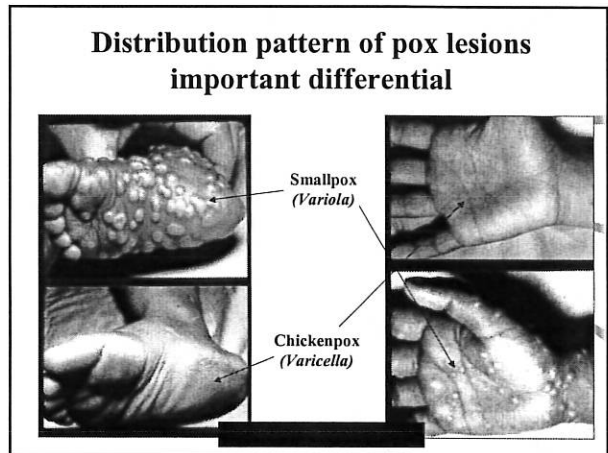
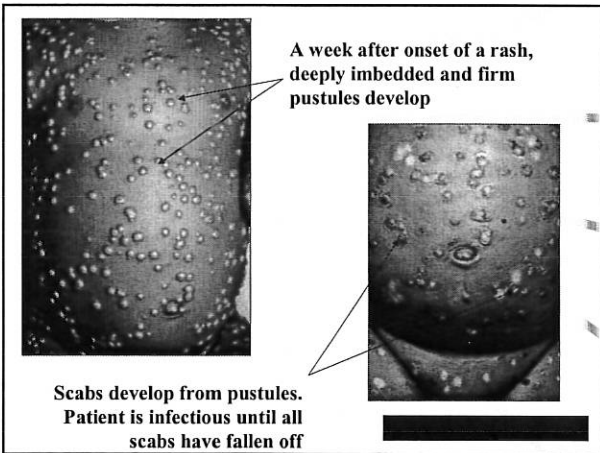
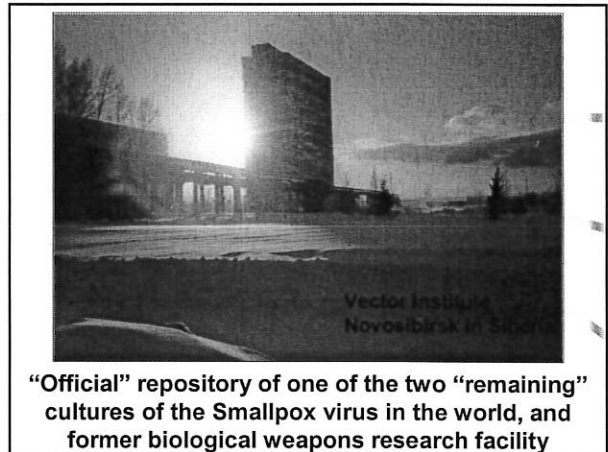
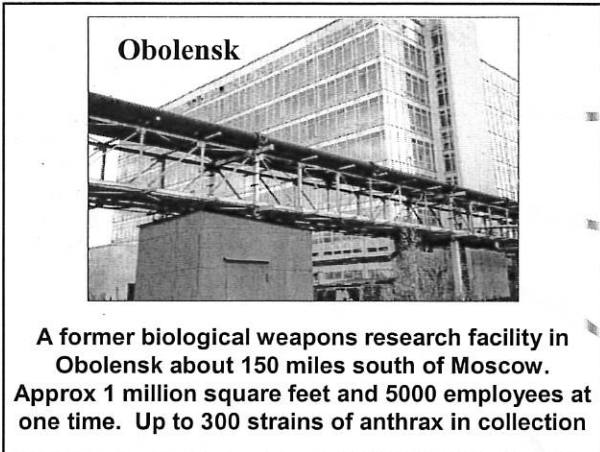
**Gastro-intestinal (oral)**

## Plague

ATLANTA, Mar 20, 2002 (BW HealthWire) – "Pneumonic plague.. has the dubious distinction of placing high on the CDC list of agents that could be deployed as a bioterror weapon, according to a report in the March 20 Bioterror Medical Alert."



"While experts note that an aerosolized release of plague would not cause a massive epidemic akin the 14th century "Black Death" scourge that killed tens of millions, **a 50-kilogram release of pneumonic plague over a large city could infect 150,000, causing 36,000 fatalities.** The release would likely not be detected until hundreds of patients began arriving in emergency rooms."



## HOMELAND SECURITY IN KANSAS: THE NATIONAL AGRICULTURAL BIOSECURITY CENTER AT K-STATE



**R. W. TREWYN**  
**VICE PROVOST FOR RESEARCH/DEAN OF THE GRADUATE SCHOOL**  
**KANSAS STATE UNIVERSITY**

Kansas State University has been promoting homeland security emergency preparedness issues for many years, well in advance of 11 September 2001. K-State's activities in this area included the following in 1999:

- ♦ Provision to U.S. Senator Pat Roberts of the *Homeland Defense Food Safety, Security, and Emergency Preparedness Program*.
- ♦ Testimony by K-State President Jon Wefald to the U.S. Senate's Emerging Threats Subcommittee entitled, *Agricultural Biological Weapons Threat: Food Safety, Security, and Emergency Preparedness*. (Copy provided).
- ♦ Meetings regarding the threat of agricultural bioterrorism were held with the Kansas Attorney General Carla Stovall, the Deputy Director of the Kansas Bureau of Investigation Terry Knowles, regional members of the FBI, and other stakeholders in and around Kansas.

K-State moved forward with the Food Safety and Security (FS<sup>2</sup>) Program even though there was little national interest in the program prior to 9/11. Following 9/11 and the subsequent anthrax assaults, the national relevance and recognition of K-State's FS<sup>2</sup> activities have increased significantly.

In 2002, K-State's FS<sup>2</sup> program gave rise to the National Agricultural Biosecurity Center (NABC). An overview of the NABC is also provided. Initial funding has been obtained from the USDA's Animal and Plant Health Inspection Service (APHIS) for projects that include Purdue University and Texas A&M University. The studies focus on: (1) the evaluation of means, hazards, and obstacles involved in contaminated animal carcass disposal, (2) the assessment of agroterrorism exercises and their outcomes, and (3) the analysis of pathways by which foreign plant and animal diseases might enter the country.

The NABC is addressing a variety of other critical homeland security issues as well. Evaluations are ongoing regarding intergovernmental management practices, means for integrating agricultural concerns and public health concerns, and ways to improve crisis communications. Hopefully, these efforts will help improve the security of K



# NATIONAL AGRICULTURAL BIOSECURITY CENTER

... protecting America's agricultural infrastructure and economy from emerging threats ...

Kansas State University (KSU) has established the National Agricultural Biosecurity Center (NABC) to expand ongoing efforts to protect America's vital agricultural infrastructure and economy from endemic and emerging biological threats.

**CONCEPT:** The National Agricultural Biosecurity Center at KSU is working with the USDA's Animal and Plant Health Inspection Service (USDA-APHIS) in collaboration with other land-grant universities and strategic partners to help coordinate the development, implementation, and enhancement of diverse capabilities for addressing threats to the nation's agricultural economy and food supply. The Center is participating in planning, training, outreach, and research activities related to vulnerability (threat and risk) analyses, incident response (including assessment of intergovernmental management issues), and detection/prevention technologies.

Land-grant universities are uniquely positioned to participate in homeland security. Ongoing research activities are focused on providing protection against endemic and introduced diseases, and they can be customized in a rapid, flexible manner to focus on emerging threats. Furthermore, the county-by-county, statewide extension services of the national land-grant system can provide frontline surveillance and response as threats emerge. In states with veterinary colleges, statewide surveillance by veterinarians can be linked to the veterinary teaching hospital and state diagnostic laboratory. These resources, when focused, coordinated, and given an educational outreach overlay through advanced information technology, provide the means for rapid responses to incidents involving emerging agricultural threats.

The Center is promoting interstate coordination between land-grant institutions, beginning with select leadership partners. Initially, these include the Center for Food Safety Engineering at Purdue University and the Institute for Countermeasures against Agricultural Bioterrorism at Texas A&M. The three institutions are working with the USDA-APHIS to facilitate an effective strategy for rapid response to agricultural threats. The initial network can then be expanded until the remainder of the land-grant system is included to establish an inclusive, 50-state response capability for homeland security.

The NABC and its partners are developing detection and prevention strategies for responding to incidents of agricultural terrorism or biowarfare. These include implementing and evaluating an integrated pathogen surveillance system in partnership with Sandia National Laboratory (SNL) and developing a suite of diagnostic, genetic, and vaccine technologies. An underlying Center asset will be a vulnerability database based upon consensus agricultural pathogens of concern. The database will be coupled to an integrated information system with portal access. Auburn and West Virginia University are already working with KSU to develop a comprehensive, agricultural threat list for use in homeland security.

Incident response activities include planning, training, reaction, and recovery components for land-grant extension service personnel, veterinarians, the producer/industry stakeholder community, and first and second responders at the local, state, and federal levels. The NABC is funded by APHIS to become a "clearinghouse for existing agroterror exercises and ... a resource for the development of new exercises." These activities are being undertaken in partnership with the ANSER Institute for Homeland Security. The vulnerability database will include agent-specific recommendations for consequence management to not only mitigate the agricultural incident but also promote effective crisis communication. The educational and outreach overlay of the Center will be critical for its continuing success. Current KSU partners, including the Midwest Research Institute (MRI) and M2 Technologies, have the ability to manage restricted/classified components that are likely to be required for some of the Center's activities.

**JUSTIFICATION:** The events of 11 September 2001 raised the national consciousness regarding external threats to homeland security. The subsequent assaults with anthrax further heightened these concerns,

especially with regard to the heinous threat of bioterrorism. Unfortunately, these events also confirmed that the country is not prepared to deal with the full spectrum of asymmetric threats that exist in the world today. They also underscored the fact that the nation's agricultural base and food supply are vulnerable.

Agriculture as a target for attack is not a new concept. Wheat stem rust, a highly deleterious disease in wheat, was the first plant pathogen weaponized by the U.S. in 1955 as part of the offensive biological weapons program. Rice blast disease and brown spot of rice fungus were weaponized and field-tested in several sites in the U.S. and Okinawa. A number of animal and zoonotic pathogens were weaponized as well. Although the U.S. terminated its offensive biological weapons program in 1969, agriculture-specific pathogens are known to be part of existing, foreign state-sponsored weapons programs. Harmful agricultural pathogens also exist naturally worldwide and are easily accessible. They can be disseminated unintentionally or intentionally using low-technology delivery methods, and regardless of intent or method, the outcomes can be devastating.

Zoonotic diseases are of special concern, owing to the potential human health effects. Although anthrax has captured much of the recent attention, Nipah virus, plague, tularemia, brucellosis and a number of other agents and diseases pose serious threats. Although not a zoonotic disease, Foot and Mouth Disease (FMD), if intentionally or unintentionally released in the U.S., would have a catastrophic effect on the food and fiber economy. America's ability to respond in a timely manner to any of these situations will depend upon a full understanding of the threats, the deployment of effective surveillance systems, and the ability to manage the consequences promptly.

Effective surveillance also implies an ability of diagnostic facilities to handle increases in surge capacity that would occur during an agricultural incident, and the flexibility of a centralized system of tracking to get the appropriate diagnostics in the right place at the right time. The misdiagnoses of Nipah as Japanese encephalitis and West Nile as St. Louis virus in the human population illustrate the importance of an integrated public health system. In addition, both West Nile and anthrax pointed out national deficiencies in diagnostic laboratory capacity.

In 1998, a congressionally designated project was initiated to establish a database for the national security community on biological agents that might be used as weapons against Americans at home and abroad. This database needs to be expanded to include exotic agricultural pathogens and to incorporate all biological agents that are of concern to the USDA. It requires continual updating as new threats emerge and as methods for prevention and/or consequence management are developed. Furthermore, the informational content of this database must be provided in a systematic and technologically relevant way to the stakeholders and the state/federal responders in the food supply system. An integrated information system is required, as is an effective method of planning and training that will be useful nationwide.

**ECONOMIC IMPACT:** Protecting America's food supply and associated agricultural infrastructure from deliberate acts of bioterrorism is of paramount importance to the U.S. and world economies. America's agribusiness sector routinely provides more than \$1 trillion annually to the U.S. economy, nearly 15% of the Gross Domestic Product. An assault on this sector of the economy could be catastrophic.

The recent FMD outbreak in Great Britain illustrates the potential economic costs that an attack on America's food crop, food animal, or food processing industry could elicit. The losses in Great Britain have amounted to tens of billions of dollars and the demise of a once-robust industry. Along with Bovine Spongiform Encephalopathy (BSE), it destroyed British consumer confidence in the safety of red meat and in their government's oversight capabilities. And while BSE has not yet occurred in the U.S., there are prion diseases present in wild and domestic ruminants.

With the concentrated production practices utilized in U.S. agriculture (a production system that feeds the world), the economic fallout from a bioterrorist attack could be orders of magnitude more severe than in Great Britain. Not only could the U.S. economy be devastated, the world economy could be as well ...



especially if multiple biological agents were introduced at multiple U.S. locations. Losses of tens of billions of dollars could be counted in days – or hours – under far too many scenarios where trade sanctions and embargos would be imposed immediately. Secondary consumer confidence and public health issues could completely ravage an already shaky economy.

**UNIVERSITY CAPABILITIES:** KSU recognized the threat to America’s agricultural economy well in advance of 11 September 2001, and initiated a comprehensive Food Safety and Security (FS<sup>2</sup>) Program to address the threat. A description of the FS<sup>2</sup> program was forwarded to U.S. Senator Pat Roberts and other members of the Kansas congressional delegation on 22 March 1999. It included the following overview:

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Kansas State University has launched a food safety and security program intended to help protect our food crops, food animals, and domestic food supply. Areas of K-State expertise relevant to endemic and emerging biological threats include pre- and post-harvest food safety, animal disease (including diagnostics and detection), crop plant resistance to disease and pests, and countermeasures against biological and chemical agents, to name but a few. K-State’s diverse, long-standing capabilities in dealing with endemic risks to our agricultural resources provide a “dual use” mechanism for protecting the nation against emerging threats whether accidentally or terrorist-introduced, i.e., by applying existing civilian capabilities to the problem, a national defense need is addressed.

FOOD SECURITY & PREPAREDNESS NEEDS:

- Advanced professional expertise
  - Animal diseases/toxicology
  - Crop plant diseases/pathobiology
  - Decontamination/detoxification
  - Food safety for food animals & crops
  - Microbiology/immunology
- Biological & chemical agent surveillance
  - Early detection & identification
  - Forensic tools and reagents
  - Remote detection
- Broad bandwidth data transmission
- Civil-military response training
- Crisis communication management
- Economic outcome assessment
- Public health planning & programs

KSU & AFFILIATED RESOURCES/EXPERTISE:

- Research/graduate/certificate programs
  - Veterinary medicine/animal science
  - Plant biotechnology/grain science
  - Chem-bio countermeasures + Nantek
  - Pre- & post-harvest food safety/HACCP
  - Distributed expertise and programs
- Interdisciplinary expertise + FoodLabs
  - Extension service & diagnostic labs
  - Biological & molecular diagnostics
  - Electronics design laboratory & GIS
- Internet II charter member & the ECC
- Food safety exigency planning & response
- Extension & continuing education resources
- Agricultural economic modeling & analysis
- Agromedicine consortium with KUMC

National Guard and Reserve military components, working in concert with civilian emergency services personnel, will function as “first responders” in dealing with direct human health threats from nuclear, chemical, or biological agents. They will likely be involved with any broad-based threat to the domestic food supply as well. Kansas State is well equipped to provide the responders with specialized advanced education and expertise in this area. In fact, K-State has a full spectrum of local, regional, and national capabilities in research, education, and outreach, including well-established relationships with Fort Riley and Fort Leavenworth. These capabilities and relationships will allow K-State to facilitate civil-military response policy development and implementation, as well as civil-military relations. In addition, K-State has research alliances with numerous public and private sector research entities that can provide additional expertise in addressing biological threats to our food supply, our economic well being, and our people.

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As stated in 1999, “K-State’s dual-use approach will be solving today’s food crop, food animal, and food safety problems, while preparing to meet and defeat emerging threats of tomorrow.” The significance is even more relevant post-9/11, and the critical importance of effective intergovernmental management and inter-institutional coordination during national crises is apparent.

KSU is establishing strategic partnerships with other land-grant universities to tackle crucial biosecurity issues for American agriculture. KSU has ongoing collaborations with Purdue and Texas A&M and additional research initiatives related to agroterrorism are being planned. KSU has also begun working with Auburn and West Virginia to assess agroterrorist threats. These institutions provide significant capabilities for addressing homeland security in critical agricultural regions.

An agricultural disease surveillance system is under development that includes three interconnected elements. (1) Animal syndromic surveillance is a real-time, full-time health monitoring system modeled after the human public health application developed by SNL. The health of sentinel herds will be monitored to increase the biosecurity of livestock production operations, and the full-service, accredited diagnostic laboratory in the College of Veterinary Medicine will be linked to the syndromic surveillance system. (2) KSU is one of six USDA-funded regional centers for plant disease surveillance. A prototype remote diagnosis system for plant diseases is already operational in Kansas. It will be linked to a centralized GIS-based database to speed recognition, analysis, and reporting of emerging problems and provide the technological framework for viewing of suspect plant materials at field level by experts worldwide within minutes of its discovery in the field. (3) KSU, MRI, and other collaborators are also developing rapid sampling and diagnostic model systems for collecting and detecting pathogenic microorganisms in food products and food processing facilities. Genetic typing will be used to characterize the source of the microorganisms and the epidemiological factors associated with the contamination event. These three surveillance elements will be linked by an integrated information infrastructure accessible via a portal website.

State legislation is also in place for a new, \$40 million FS<sup>2</sup> biocontainment (biosafety level-3) research facility at KSU that will be unique in its integrated approach. The functional cores of the BL-3 building will include (1) animal rooms and support facilities for diagnostic analyses and research on infectious agents of food animals, (2) a slaughter floor and associated meat processing capabilities to validate technologies developed to control infectious agents during processing, and (3) laboratories designed for work on controlling pathogenesis and toxin biosynthesis by existing and emerging food crop pathogens.

**ORGANIZATIONAL ELEMENTS:** The National Agricultural Biosecurity Center was established to protect America's agricultural infrastructure and economy from endemic and emerging biological threats. The Center's functional organizational elements include the following:

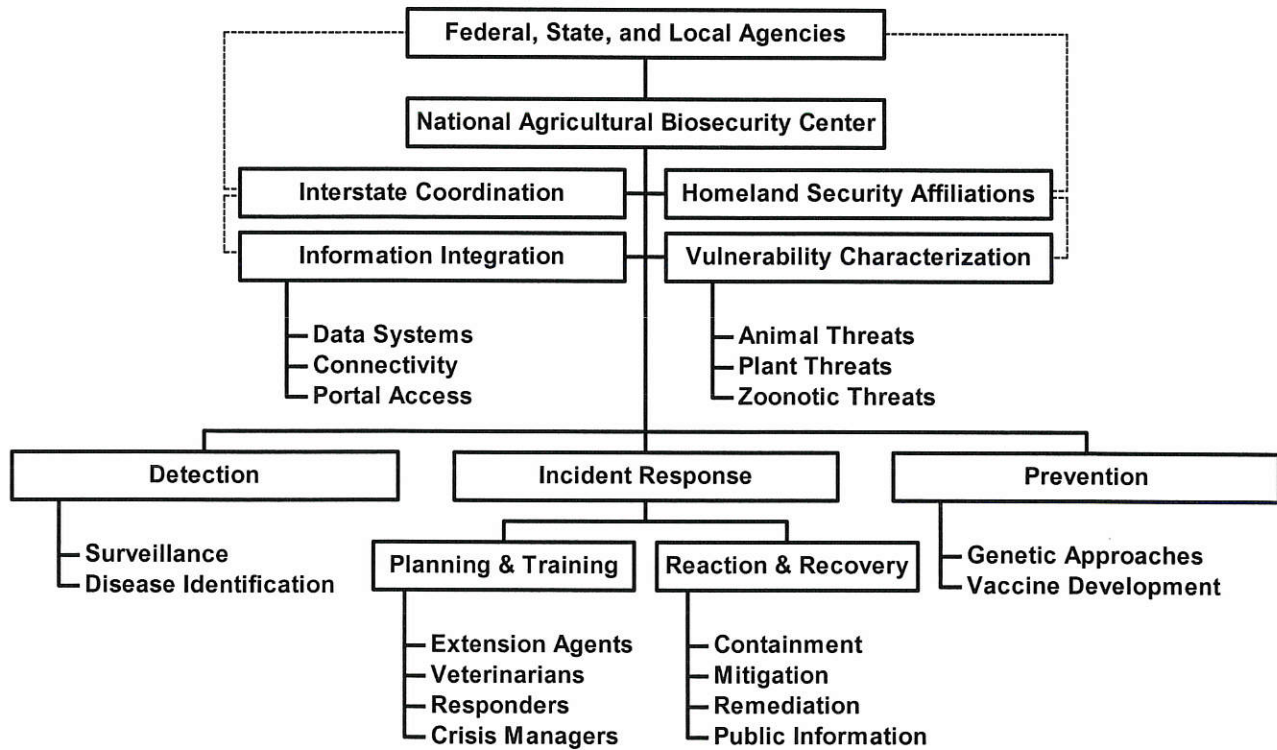
- *Program Administration/Interstate Coordination:* A system of program administration is designed to facilitate Center needs and ensure appropriate communication between the USDA, the inclusive network of land-grant institutions, the various stakeholder communities, and the Center's planning, training, and research activities. When coupled with the integrated information infrastructure below, the Center will build a nationally networked community of scholars working on agricultural biosecurity who can communicate from great distances. A Center director with expertise in homeland security will be appointed, and Dr. Nancy Jaax (having over 25 years of experience in biodefense-related infectious disease research) is serving as interim director pending a national search.
- *Homeland Security Affiliations:* The Center's activities will include components that are restricted or classified in nature. Dr. Jerry Jaax, Associate Vice Provost for Research Compliance, maintains a security clearance, but KSU strategic partners equipped to deal with such matters would manage classified information and projects. KSU has long-standing collaborative relationships with MRI in Kansas City on agriculture-related research projects and MRI has appropriate clearances. Likewise, KSU has agreements in place with M2 Technologies, Inc., a Massachusetts-based defense contractor with DOD security clearances, working in the nonlethal weapons and consequence management arenas. These entities can respond quickly to meet human resource surge capacity needs during an agro-security emergency. Moreover, they can acquire critical "think tank" expertise more quickly than government agencies or universities to address specific threats.
- *Information Integration:* Information in the form of accumulated knowledge is a valuable asset, and it must be managed, protected, secured, and available in ways that facilitate its use. The Center will employ a portal system that provides security with flexibility and access. KSU is already developing a distributed digital information storage system for all its administrative data. It is designed to include a management system that employs "smart data" (making it platform and management system

independent), to be responsive to semantic controls that can locate and integrate meaningful information from a variety of individual storage islands, and to render differences in platforms or formats cryptic to the user. This system will be adapted to address agricultural biosecurity needs.

- *Vulnerability Characterization:* KSU, Auburn University, and West Virginia University have prepared an agricultural threat list for the purpose of developing a comprehensive threat dataset and vulnerability-based metrics. Applied R&D will be performed on threat list agents for the purpose of protecting American agriculture. Risk assessment will be coupled to these tasks to help establish priorities for resource allocation. The data will be linked to the integrated information system with portal access, and will be an underlying Center asset providing focus for the educational overlay and planning/ training activities for agricultural incidents. Tasks have been divided among the three institutions to expedite the data collection and vulnerability R&D analyses, and the funds for this part of the work will be allocated equally. The threat list will be updated frequently, adding the latest risk assessment data and agent-specific detection, prevention, and incident response methodologies.
- *Detection:* The Center and its strategic partners will develop detection methods for identifying adverse agricultural incidents. This includes implementing and evaluating an integrated pathogen surveillance system, unified by the integrated information infrastructure and accessible via a portal website. State-of-the-art identification technologies and diagnostic analyses will be linked to the surveillance activities along with epidemiological studies. The surveillance system is under development and, upon completion, will include elements for animal syndromic surveillance, distributed plant disease diagnostics, and food rapid sampling and diagnostics. Implementing the animal syndromic surveillance system in collaboration with SNL will be an initial priority due to the greater vulnerability of the food animal sector to agro-terrorist threats.
- *Incident Response:* Preparing for and responding to an agro-terrorist incident has perhaps the greatest urgency, but this will likely require a significant reorientation of intergovernmental management at various levels. As a result, priority will be placed on these efforts initially.
  - *Planning and Training:* The comprehensive agricultural threat database will be used to develop incident response plans for university statewide outreach components and coordinating those plans with local, state, and federal responders and crisis managers. In conjunction with the NABC's "clearinghouse" function for agroterror exercises, it will also be used to produce mediated instructional materials for producers, veterinarians, the food production and agribusiness sectors, and first and second responders and to provide them with up-to-date training. A graduate education program has already been developed in food safety biotechnology, so this program will be applied, in a dual-use manner, to agricultural biosecurity. Discussions are ongoing with neighboring Fort Riley to establish a linkage by which the Center, the Fort, and the National Guard will partner in an agricultural incident training, planning, and modeling program. As part of the initial planning and training efforts, KSU cosponsored an ag bioterrorism conference with the Koch Crime Institute on March 25-26, 2002 in Manhattan.
  - *Reaction and Recovery:* There is no way to predict with certainty when a significant agricultural disease outbreak – intentional or unintentional – might hit the U.S., but all sectors must be prepared to respond. The Center will develop and assess means for rapidly confronting and recovering from adverse agricultural incidents, and it will provide expertise in the areas of containment/quarantine, mitigation/treatment, and remediation/recuperation. The Center will also facilitate the development and dissemination of public information regarding the event.
- *Prevention:* The prevention of agricultural diseases is a major priority for the Center. As a result, significant resources will be allocated to identifying, developing, and fielding new prevention strategies. Ongoing studies at KSU are providing new insights into pathogen biology and the understanding of pathogenicity, and modern genomic and proteomic techniques are being used to generate disease resistant cereal grains and to develop new vaccines for food animals.



# KANSAS STATE UNIVERSITY National Agricultural Biosecurity Center



**Center Administration:** Dr. Nancy K. Jaax, Interim Director

**Interstate Coordination:** Coordinating agricultural biosecurity activities with federal, state, and local agencies as well as other universities and strategic partners; working with the USDA and other federal, state, and local agencies to facilitate an effective strategy for rapid response to emerging agricultural threats.

**Homeland Security Affiliations:** Providing non-public means for managing classified or restricted access biosecurity data, information, and projects; addressing human resource surge capacity needs; adding an external “think tank” capability to address agro-security emergencies.

**Information Integration:** Facilitating the integration, retention, and accessibility of information and data concerning agricultural disease threats to ensure rapid stakeholder notification and data exchange.

**Vulnerability Characterization:** Developing a comprehensive database and performing R&D with strategic partners on animal, plant, and zoonotic threats; continually updating and incorporating the latest risk information and agent-specific detection, prevention, and incident response methodologies.

**Detection:** Implementing statewide remote surveillance mechanisms for animal, plant, and zoonotic threats; developing, assessing, and utilizing state-of-the-art diagnostic tools for identifying pathogens and toxins.

**Incident Response:** Addressing and resolving emerging agricultural disease outbreaks in a timely manner. New approaches to intergovernmental management are being assessed for possible implementation in the future.

**Planning and Training:** Developing incident response plans for university statewide outreach components and coordinating those plans with local, state, and federal response units; developing and providing up-to-date training and training materials utilizing modern, mediated instructional methods.

**Reaction and Recovery:** Developing and assessing means for rapidly confronting and recovering from adverse agricultural incidents; providing expertise regarding containment/quarantine, mitigation/treatment, and remediation/recuperation; facilitating public information dissemination.

**Prevention:** Identifying, developing, and fielding new prevention strategies; utilizing modern genomic and proteomic techniques to generate disease resistant plants, develop vaccines for food animals, and otherwise provide prophylactic protection from agricultural threats.

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# AGRICULTURAL BIOLOGICAL WEAPONS THREAT

## FOOD SAFETY, SECURITY, AND EMERGENCY PREPAREDNESS

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### KANSAS STATE UNIVERSITY

JON WEFALD, PRESIDENT



R.W. TREWYN, VICE PROVOST FOR RESEARCH, DEAN OF THE GRADUATE SCHOOL

RALPH C. RICHARDSON, DEAN OF VETERINARY MEDICINE

ROBERT S. ZEIGLER, HEAD OF PLANT PATHOLOGY, DIRECTOR OF PLANT BIOTECHNOLOGY

JAMES L. MARSDEN, REGENTS' DISTINGUISHED PROFESSOR OF MEAT SCIENCE

JERRY P. JAAX, UNIVERSITY RESEARCH COMPLIANCE OFFICER

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With the end of the Cold War, the United States is the world's dominant military superpower. Although America may be compelled at times to engage in military actions around the world, there are few conventional military threats to our national security.

With the explosion of the Information Age, driven largely by the United States, the American economy has surged past our global competitors. The United States is the world's dominant economic superpower, and as a result, there are few conventional economic threats to our national security.

In these apparently secure times, it would be easy to become complacent.

But what about unconventional threats to our national security?

Biological weapons of mass destruction and means for mass disruption are available for rogue governments and extremist groups. Could they threaten our national security? Positively! You can bet your way of life on it.

The "homeland defense" initiative and related endeavors have been undertaken to protect our country from weapons of mass destruction or, perhaps more accurately, to provide a means for rapid response when such threats become a reality. As of early 1999, these efforts focused almost exclusively on preparing America's population centers for threats to human health – predominantly, those of chemical and biological origin.

However, the recent encephalitis outbreak in New York City caused by the West Nile virus illustrates just how far we have to go in recognizing and dealing with exotic biological threats. Fortunately, a veterinarian at the Bronx Zoo – a pathologist examining dead birds – was persistent in her efforts to convince federal public health officials that there might be a relationship to cases of encephalitis in the area.

Although it may seem strange to some that a veterinarian linked bird deaths to a human health problem, many of the world's most dangerous biological agents – anthrax, Ebola,

Select Committee on Kansas  
Security

Attachment 3-1

Date 2-14-03

and the like – are known to be transmitted from animals to man. It was surprising, therefore, to read in the New York Times on 11 October 1999 that “no one had anticipated an outbreak in which crucial evidence would be uncovered by a wildlife specialist.” This should be an integral part of the homeland defense surveillance program.

The importance of protecting our food crops, food animals, and domestic food supply is paramount. Agricultural production provides 22 million jobs in the U.S., even though less than 2 million are farmers and ranchers per se. The agribusiness sector contributes over \$1 trillion annually to our economy, which amounts to 15% of the U.S. Gross Domestic Product.

What would happen to the American economy if a significant portion of our food supply was destroyed by plant or animal pathogens or was tainted (or even thought to be tainted) with toxins or human pathogens?

What would happen to food prices in the U.S. where less than 10 cents of every household dollar is spent on food? In some developed countries, spending for food can be two or three times that amount. In third-world countries, it can approach five times. Think about the impact on our economy if food prices doubled or tripled in a matter of weeks or months.

Our agricultural exports amount to approximately \$60 billion annually. If the foreign wheat pathogen karnal bunt finds its way into U.S. wheat fields, our exports of wheat would be halted immediately. Karnal bunt is already as close as Mexico. Likewise, if our domestic livestock become afflicted with foot and mouth disease, American beef and pork exports would be embargoed at once. Foot and mouth disease is found in Cuba and many other countries around the world.

Karnal bunt and foot and mouth disease are but two of a multitude of naturally occurring biological threats to American agriculture. Almost any of these could show up in the U.S. quite by accident ... or, perhaps, not by accident.

There are many reasons to believe that rogue governments and extremist groups might prefer to use agricultural biological weapons against the U.S. rather than targeting people in American cities. First, the technology involved is less sophisticated, and there is much less risk to the individuals collecting or developing the biological agents, i.e., it's easier and safer for the perpetrator. In military jargon, food crops and food animals in the U.S. represent “soft targets;” they're largely unprotected and vulnerable to attack. The likelihood of U.S. officials detecting the attack early on is also slight, thereby allowing plausible denial and reduced retaliatory risk. And, finally, there are fewer ethical quandaries for those who might hesitate to kill people randomly and indiscriminately. This could be especially true for some American radical groups.

There are also lessons from the past that argue for the use of biological weapons targeted to agriculture rather than people. Prior to the unilateral termination of the biological weapons program in the U.S. in 1969, experts in the program had surmised that food crops and food animals could be decimated with greater certainty than could human populations. A human epidemic/pandemic could not be assured with any of the biological agents available

at the time. And even the highly virulent and alarming Ebola outbreaks in Africa a couple decades ago burned themselves out almost as quickly as they appeared.

Targeting agricultural crops and animals is another matter. Brucellosis, hog cholera, Newcastle disease in poultry, wheat rust, and rice blast disease were all weaponized in the old BW program. Field tests suggested that these weapons might well induce large-scale epidemics. And while the U.S. stopped production of biological weapons in the 1960s, a number of other countries have continued researching and producing these weapons into the 1990s – Russia, China, North Korea, Iraq, Libya, Pakistan, and a dozen or so more. Many, if not all, of these countries have agricultural biological weapons in their arsenals. The advantage they perceive is clear: infectious biowarfare agents have the potential to proliferate broadly once they're released; the devastation from chemical weapons remains relatively contained.

Consider for a moment a scenario where only wheat and rice are targeted. Wheat and rice account for an astonishing 45% of the world's calories. A terrorist strike against the cereal crops would threaten the foundation of our food supply – the foundation of the world's food supply. A widespread disease outbreak affecting these crops could cause worldwide famine. A localized strike against these “soft” targets with a quarantine pathogen could cause an embargo of U.S. exports, threatening our balance of payments and causing regional economic collapse.

To make matters worse, a terrorist strike against our food crops could occur without requiring that the terrorists set foot on American soil. African ergot, a serious disease of sorghum, was introduced inadvertently into southern Brazil in 1996. By 1997, it had spread throughout Latin America and had arrived in the northern most sorghum producing areas of Nebraska.

That's not reassuring.

The concentrated, modern-day production practices for beef, swine, and poultry provide easy, “soft” targets of opportunity as well. The beef feedlot industry in the central plains already sustains huge financial losses annually from infectious diseases and foodborne pathogens. And livestock in the U.S. are no longer vaccinated against many of the infectious agents that were eradicated here decades ago, creating at-risk populations for many deadly and highly infectious diseases. How's that for an easy mark for terrorists? A vial containing pathogens for foot and mouth disease, bovine tuberculosis, cowpox, or something more exotic or genetically engineered could be devastating.

The vision of National Guard troops having to machine-gun tens of thousands of diseased cattle in Kansas' feedlots doesn't present a pretty picture.

Of course, human foodborne pathogens and toxins can't be ignored as terrorist threats either. Various mycotoxins occur naturally in moldy grains, cereals, and agricultural products. The insidious nature of these toxins rests in the fact that they are effective at extremely low dosages, they can accumulate significantly in feed grains in the absence of yield reduction in the field, and microorganisms can be genetically engineered to increase toxin production and potency. These toxins can cause a variety of human health problems,

including neurological disorders, liver failure, cancer, and death, and they would make ideal biological weapons targeted to agricultural products. The mycotoxin T2 has already been implicated in suspected biological attacks.

Then there's the more traditional foodborne pathogens that have caused significant health problems in the U.S. in recent years – *E. coli*, *Salmonella*, *Listeria*, *Cryptosporidium*, Hepatitis A, and many more. Corruption of the domestic food supply with such agents in the absence of bioterrorist activity is already a tremendous societal burden. And if unintentional contamination of our food supply is potentially devastating, the terrorist threat in the food arena is almost incalculable. What even more horrific biological agents might be introduced? The causal agent for Mad Cow Disease perhaps? There are plenty of pathogens out there to choose from, and the food processing industry is another one of those "soft" targets.

So, as we look to the new millenium, what's the greatest plausible threat to America's national security? The Y2K bug? Terrorist attacks on U.S. cities? No, it's more likely to be the use of agricultural biological weapons against our food supply. And America can't just go out on the world market and purchase food as a replacement for losses sustained in such an attack. We *are* the world food market.

Countering the agricultural biological weapons threat will take a coordinated effort involving federal, state, and local government entities, relevant industries, and America's research universities. By leveraging the unique strengths of each stakeholder, effective surveillance and response strategies can be developed for mitigating the threat. Moreover, R&D programs focused on the detection and prevention of emerging biological threats can evolve quite reasonably from existing programs addressing endemic threats to our food crops, food animals, and domestic food supply.

Of all the requirements for an effective civil defense, food safety and security program, providing adequate surveillance would seem the most difficult to implement with any degree of certainty. Ideally, there should be individuals trained in recognizing plant and animal diseases and foodborne pathogens stationed near every agricultural soft target coast to coast, so early diagnosis could be assured. It sounds impossible ... and expensive. However, America's land-grant university system may offer the answer.

University scientists – extension specialists, plant pathologists, veterinarians, food safety experts – may very well be the first to encounter and diagnose an emerging agricultural biological threat, whether naturally occurring or terrorist introduced. In the land-grant system, relevant expertise is available county by county, state to state. Why not mobilize this system for surveillance, early detection, and rapid response?

University scientists are already developing new means for detecting and dealing with endemic threats to our food crops, food animals, and domestic food supply. They're addressing disease prevention by breeding and genetically engineering food crops for multi-agent resistance. They're providing surveillance and diagnosis for plant and animal pathogens and toxins, and they're developing innovative diagnostic tools. They're creating better vaccines for endemic diseases of food animals. They're developing improved methods for screening and decontaminating tainted food products.



As America's first land-grant university, Kansas State has a long history of dealing with endemic threats to our food supply. In fact, we've been working in all the areas mentioned above. And being situated in America's food producing heartland – Kansas being the number one producer of wheat, sorghum, and beef – we're likely to be at the epicenter of an agricultural biological weapons attack. As a result, we opted to mobilize.

As part of a statewide advanced technology initiative earlier this year, K-State identified agricultural biotechnology as a primary strategic thrust to drive the economic engine of Kansas; food safety and security is an integral part of this effort. We have over 130 faculty scientists working on topics of relevance. We have strong programs in developmental biology that underpin the agricultural biotechnology initiative. K-State faculty are studying the biochemistry and molecular biology of pathogenesis. If we are to develop broad-based protective measures against infectious agents, an understanding of virulence factors and how pathogenic mechanisms overcome resistance is essential. K-State also has unique strengths in insect molecular genetics, insects being the vectors for many dangerous pathogens.

K-State has established and garnered NSF support for the Great Plains Cereals Biotechnology Consortium with formal linkages to the University of Nebraska, Oklahoma State University, and the Noble Foundation. Major research efforts are ongoing to introduce broad-spectrum disease resistance in cereals. K-State has proprietary intellectual property in this area. Related collaborative efforts are already in place with the International Rice Research Institute in the Philippines and the International Corn and Wheat Center in Mexico. Additionally, K-State has unique scientific expertise in the genetics of mycotoxin production in the fungal pathogen *Fusarium*; expertise that is being applied to develop protective measures against these insidious toxins.

K-State has a long-standing program in pre- and post-harvest food safety, which links veterinarians and animal scientists in statewide and regional efforts to protect our food animals and domestic food supply. Improved state-of-the-art diagnostic tools for infectious agents and foodborne pathogens are under development continuously. Innovative infrared imaging technologies are being applied to the cattle and swine production industries for the purpose of screening health and other production parameters. Commercial applications for steam pasteurization of adulterated carcasses were perfected at K-State, and uses for electronic pasteurization are being evaluated. To deal with endemic and emerging biological threats, K-State scientists are working on detection, prevention, and rapid response methods from the feedlot to the market place.

We're building strategic partnerships with private sector entities with a stake in food safety and security. We have ongoing research, licensing, and training arrangements with major corporate partners in the food crop, food animal, and food safety arena. We partner with small firms as well. Steris FoodLabs, a food safety firm started in Manhattan, provides chemical and microbiological testing services as well as HACCP validation and verification. It's located in Manhattan because of the broad-based food safety expertise at K-State. Nantek, a local startup company based on university intellectual property, has numerous formulations of reactive small molecules that can be deployed to destroy toxic chemicals. Some of these materials destroy nerve gas almost instantly. Others have

bioreactive capabilities, inactivating anthrax spores and various plant pathogens in a matter of minutes. Nantek countermeasures have proven broadly effective.

K-State, through our Electronics Design Laboratory, is working with Sandia National Laboratory on the remote detection of biological materials. We are helping to design components for an airborne ultraviolet laser detection system for biological weapon aerosols. This technology is likely to have broad applications in protecting the U.S. from biological weapons of various types.

University representatives have met with the Kansas Attorney General and the Kansas Bureau of Investigation to discuss agricultural forensic needs K-State might provide in addressing the biological weapons threat. We joined with the University of Kansas Medical Center to become part of the national Agromedicine Public Health Consortium, in an effort to provide better health protect for our rural agricultural workers. We have a well-established crisis communication network, which could be crucial in dealing with a bioterrorist attack. We've established a military graduate student recruitment program to increase the pool of highly qualified and motivated students to work on homeland defense and other contemporary research issues.

We're developing graduate certificate programs targeted to food safety and security. Food safety experts from around the country and the world congregate in Manhattan each summer for a hands-on workshop to learn about the latest food safety technologies; next year will mark the 20<sup>th</sup> anniversary of this program. Food safety and HACCP training modules are also being adapted for distance delivery.

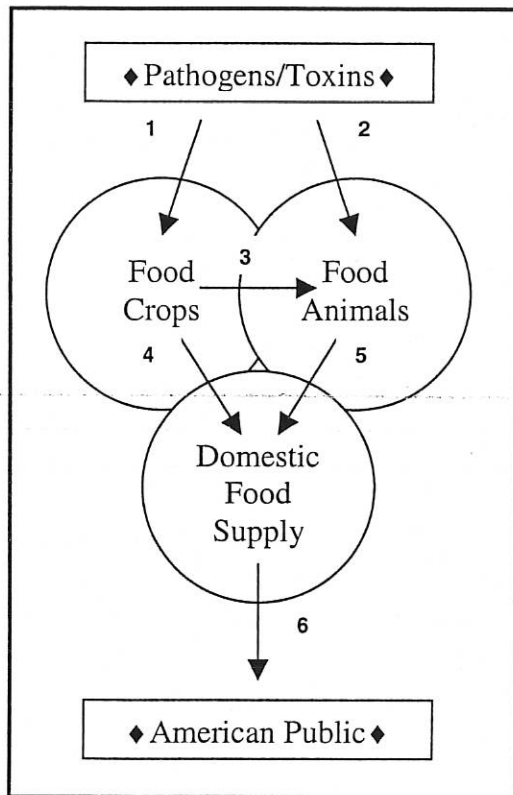
In addition to being a member of the national Agricultural Distance Education Consortium, K-State has launched a pioneering distance education initiative via Internet-2. This real-time effort links instructors and students at K-State, Nebraska, and Oregon State (three land-grant universities) to teach the genetics of resistant and susceptible interactions between food crops and the bacteria, viruses, and fungi that attack them. This topic has immediate applications to the agricultural biological weapons threat. Moreover, perfecting this broad-bandwidth instructional approach will allow the whole land-grant system and other stakeholders to be brought up to speed quickly on complex homeland defense imperatives.

It is our belief that K-State will not be able to fulfill one of the most important land-grant missions of the next millenium if we are not prepared to deal with emerging threats to our agricultural resources. The most daunting challenges may well involve agricultural bioterrorism.

We trust that we have alerted the Subcommittee to the gravity of the threat that looms over our nation's food supply – *the threat that looms over the world's food supply and the global economy*. America has the capacity to meet and defeat this threat, but the time for concerted action is now.

# ATTACHMENT A

## 1. THREATS POSED BY ENDEMIC & EXOTIC PATHOGENS AND/OR TOXINS:



### THREATS [NUMBERS 1-6 IN THE DIAGRAM]:

1. a) Plant pathogens or toxins transmitted to food crops.  
b) Animal pathogens or toxins transmitted pre- or post-harvest to food crops.  
c) Human pathogens or toxins transmitted pre- or post-harvest to food crops.
2. a) Animal pathogens or toxins transmitted to food animals.  
b) Human pathogens or toxins transmitted pre- or post-harvest to food animals.
3. a) Plant pathogen or toxin-induced losses of crops to feed animals.  
b) Animal pathogens or toxins transmitted via crops to food animals.
4. a) Plant pathogen or toxin-induced losses of crops for the domestic/global food supply.  
b) Human pathogens or toxins introduced into the food supply from food crop products.
5. a) Animal pathogen or toxin-induced losses of food animals for the domestic/global food supply.  
b) Human pathogens or toxins introduced into the food supply from food animal products.
6. Human pathogens or toxins transmitted to the American public.

## 2. UNIVERSITY EXPERTISE RELEVANT TO ENDEMIC & EMERGING THREATS:

### FOOD SECURITY & PREPAREDNESS NEEDS

- Advanced professional expertise
  - Animal diseases/toxicology
  - Crop plant diseases/pathobiology
  - Decontamination/detoxification
  - Food safety for food animals & crops
  - Microbiology/immunology
- Biological agent surveillance
  - Forensic tools and reagents
  - Remote detection
- Broad bandwidth data transmission
- Civil-military response training
- Crisis communication management
- Economic outcome assessment
- Public health planning & programs

### UNIVERSITY RESOURCES & EXPERTISE

- Research/advanced education programs
  - Veterinary medicine/animal science
  - Plant biotechnology/grain science
  - Biological countermeasures research
  - Pre- & post-harvest food safety/HACCP
  - Distributed expertise and programs
- Broad-based interdisciplinary expertise
  - Biological & molecular diagnostics
  - Electronic detection design & GIS
- Internet II & satellite downlinks
- Food safety exigency planning & response
- Extension & continuing education resources
- Agricultural economic modeling & analysis
- National agromedicine consortium

## ATTACHMENT B

### BIOGRAPHICAL SKETCHES OF THE KSU SCIENTIFIC ADVISORY TEAM:

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**R.W. TREWYN, PHD**, is Vice Provost for Research and Dean of the Graduate School at Kansas State University and President of the KSU Research Foundation. After serving as a staff sergeant in the infantry in Vietnam, he obtained his PhD from Oregon State University in 1974. He conducted research at the University of Colorado Health Sciences Center, then joined the medical school faculty at Ohio State University in 1978, attaining the rank of Professor of Medical Biochemistry in 1988. His research efforts focused on the molecular and cellular events involved in cancer development and treatment. In 1994, he assumed the positions of Associate Vice Provost for Research and Professor of Biology at Kansas State. He became President of the Research Foundation in 1995 and Vice Provost and Dean in 1998.

**RALPH C. RICHARDSON, DVM**, is Dean of the College of Veterinary Medicine of Kansas State University. He obtained his DVM in veterinary medicine at Kansas State University in 1970, and completed an internship (Purdue University, 1973) and a residency (University of Missouri-Columbia, 1975) in small animal medicine. He was captain in the U.S. Army Veterinary Corp. Following several years in private practice, he joined the faculty of the School of Veterinary Medicine of Purdue University. He attained the position of Head of Veterinary Clinical Sciences, before joining Kansas State University as Dean of the College of Veterinary Medicine in 1998. He has research expertise in the areas of comparative oncology and clinical trials, with more than 35 scholarly journal articles and book chapters.

**ROBERT S. ZEIGLER, PHD**, is Head of the Department of Plant Pathology and Director of the Plant Biotechnology program. He obtained his PhD from Cornell in 1982. He has spent 20 years in research and research management in tropical developing countries primarily with the International Rice Research Center (IRRI) in the Philippines and the International Center for Tropical Agriculture (CIAT) in Colombia. His research has been principally on rice diseases, and the main focus of his research has been on rice blast disease – one of six fungal plant pathogens of serious bioterrorism concern. Research domains in rice blast include fungal pathogen population genetics and genetics of durable host plant resistance – two critical areas for anti ag-bioterrorism efforts. As a research manager with global responsibilities, he has had very broad experience in plant pathogens of agricultural importance in the Americas, Africa and Asia.

**JAMES L. MARSDEN, PHD**, is the Regents' Distinguished Professor of Meat Science in the Department of Animal Science and Industry. He obtained his PhD in food science from Oklahoma State University in 1974. He advanced through a number of industrial positions over the next 15 years, and joined the American Meat Institute in 1989, first as Vice President, then as President in 1993. He was recruited to KSU in 1995. He is an internationally recognized expert on food safety and the Hazard Analysis and Critical Control Point (HACCP) system in the meat and poultry industry. As such, he has consulted and lectured extensively on these topics. He served as the Senior Scientific Advisor for the North American Meat Processors. He has provided expertise to help control insidious foodborne pathogen outbreaks in the U.S., and presented expert commentary to national news media about these events.

**JERRY P. JAAX, DVM**, is the University Research Compliance Officer and University Veterinarian of Kansas State University. He obtained his DVM from KSU in 1972 and became a Diplomate of the American College of Laboratory Animal Medicine in 1984. He is a graduate of the U.S. Army Command and General Staff College (1984), and has been a consultant to the Surgeon General of the Army for research animal care and use. Prior to returning to KSU in 1998, he was the Chief of the Veterinary Medicine Division of the United States Army Medical Research Institute of Infectious Diseases (USAMRIID), Ft. Detrick, MD, and Director of the Biological Arms Control Treaty Office at Ft. Detrick. He spent nearly 20 years working in medical defense against biowarfare (BW) agents, BW treaty compliance, and BW counterproliferation efforts. He is an expert in high-hazard animal care and use biocontainment, and as such, played a key leadership role in the emergency response and management of the Ebola virus emergence in Reston, VA. He is a retired Colonel in the U.S. Army Veterinary Corps.