

Extension Agent Critical Infrastructure Threat Awareness Training Introduction to Food Supply System Threats

There are 19 Critical Infrastructure sectors that have been identified by the United States Department of Homeland Security. Each of these sectors is deemed to be critical to our nation's well-being and survival. One of these sectors, Food and Agriculture, is at the very heart of what Extension is all about. Regardless of our individual program areas, our mission as a agency is to educate the people of our state in the areas of agriculture and family and consumer science. While we will use many different approaches and target a wide variety of clientele with our programming efforts, the core of our Extension work lies with our food supply and production system. Additionally, Extension is unique in that, although we are a single, state agency, we are also tied closely with local governments. Having an office and professional staff in each of our 95 counties gives us the flexibility to design our programming efforts to meet the needs of each of these counties. Rural or urban, large or small, Extension is present from Memphis to Mountain City and Copper Hill to Tiptonville.

Such geographic and demographic diversity also provides Extension Agents with the opportunity to be acutely aware of the critical need to preserve the integrity of our food supply system. This awareness must come with an understanding of the many challenges and threats that, unfortunately, our food supply system faces each day. Regardless of the label we use for these threats - agroterrorism, food safety, bio-terrorism – the fact remains that there exists today, more than ever, individuals who would intentionally use our food supply system from “farm to fork” to cause physical harm and create social and political instability.

Agroterrorism is the deliberate introduction of a chemical or disease agent, either against livestock/crops or into the food chain, for the purpose of undermining stability and/or generating fear. Agriculture is considered by many to be the perfect target for terrorism because the agriculture industry is unmatched in revenue and scope. Food and fiber account for approximately 13% of the Gross Domestic Product (GDP). 24 million Americans—two percent of the population—are directly employed in agriculture. In 1997, the agriculture industry generated over \$1 trillion worth of business, a large portion (roughly \$140 billion) of which was derived from export markets. The U.S. has nearly two million farms where crops and animals are raised to provide the steady flow of high-quality, safe, and inexpensive foods for Americans and people around the world. The U.S. has become the world's leader in food production. In 1997, corn generated nearly \$20 billion in sales, soybeans generated \$16 billion, cattle generated \$40 billion, and poultry generated \$22 billion. In 1997, within the state of Iowa alone, there were over \$3 billion in sales of corn, \$2.7 billion in soybeans, and \$3 billion in pigs.

Effects of Agroterrorism

Agroterrorism can be as devastating as other forms of terrorism, because it produces the following effects:

- Cripples the economy of a nation
- Destroys the livelihood of many people
- Puts the food supply at risk, perhaps for a long time
- Might not be easily detected before it reaches difficult-to-control levels (Davis, par. 1)
- Causes mortality and morbidity

Many consider agriculture to be the perfect target for terrorism because of the industry's unmatched revenue and scope. America is a world leader in food production. An attack upon any segment of the food industry could have catastrophic effects upon the whole economy. The magnitude of such damage can be seen from the following:

- According to the USDA, the farm sector is the largest positive contributor to the U.S. trade balance.
- The U.S. produces nearly 50% of the world's soybeans, over 40% of its corn, 20% of its cotton, 12% of its wheat, and over 16% of its meat.
- In 2002, America had approximately 2.2 million farms totaling over 900 million acres.
- In some of the Northern Plains states, agriculture accounts for over 10% of employment and gross state product.

Financial losses would accrue from a number of interrelated consequences, including:

- Direct losses of agriculture commodities to disease
- Costs of diagnosis and surveillance
- Required destruction of contaminated crops and animals to contain disease
- Costs of disposal of mortalities and carcasses
- Damage to public and consumer confidence

- Losses due to export and trade restrictions
- Disruption of commodity markets (Parker 14)

Due to Foot-and-Mouth Disease (FMD), the world's beef markets have traditionally been divided into disease-restricted (those having significant FMD present) and disease-free countries. The U.S. and Canada have been considered disease-free producers of beef for the world's markets. With the emergence of Bovine Spongiform Encephalopathy (BSE), or Mad Cow Disease, the world's beef producers became categorized further, depending upon whether BSE was present in the beef supply.

What Makes Agroterrorism Attractive to Terrorists?

Agroterrorism can exist in different forms with different targets. In one instance, terrorists might use biological agents to attack food crops or animals to affect the economy itself. As discussed above, an outbreak of BSE in cattle could damage the ability of the U.S. to export beef, resulting in further losses of market share. In that instance, the target of the attack would be the U.S. economy, not the animals.

Agricultural pathogens are relatively easy to obtain and to disseminate. A successful attack does not need to infect large numbers of animals. Many pathogens spread aggressively and, once introduced, can infect the entire herd within a short time (Casagrande, par. 2).

FEMA identifies the threat of biological weapons on agriculture as the following:

Biological weapons are not just a threat to human health. A terrorist armed with animal or plant pathogens also threatens the livestock, poultry, and crops of the agricultural sector, a vital part of the U.S. economy. The fact that a single, determined individual or small group could bring all U.S. beef or wheat exports to a halt underscores the need for increased defense against this threat (FEMA E-1).

Agroterrorism may be an attractive tool for terrorists' use because it offers the following:

- *Lower physical risk*—Disseminating a plant or livestock disease organism presents less physical risk to the terrorists than releasing human pathogens or using other Chemical, Biological, Radiological, Nuclear, or Explosive (CBRNE) weapons.
- *Smaller chance of outrage and backlash*—Agroterrorism is not likely to create the same kind of public reaction and backlash as using a weapon that kills people.
- *Similarity to natural outbreaks*—Use of plant or animal pathogens can create outbreaks that resemble natural outbreaks, thereby reducing the risk of early detection *Lower technical barriers*—Materials needed are relatively easy to acquire. Small quantities are needed and are easier to transport to the area of intended use. Infection of a small number

of animals or small groups of plants would normally be sufficient to cause an outbreak of the disease. An epidemic could be caused by dropping Newcastle Disease-contaminated bird droppings into a feeding trough, or by placing tongue scrapings from FMD-infected animals into the ventilation system of a large hog-production operation (FEMA E-2).

- *Economic impact*—Agroterrorism delivers a high-value impact.

History of Agroterrorism

In WWI, German operatives carried out a sabotage campaign targeting draft animals, military cavalry, and food animals with anthrax and glanders. The purpose was to interrupt Allied transportation and supply lines. These campaigns were carried out in a number of countries, including the U.S., Argentina, Romania, France, Mesopotamia, Spain, and Norway. Germany's WWII agricultural work included FMD. During the 1942-43 occupation of Russia, experiments were carried out on cattle and reindeer on an island in Lake Peipus (Ban 2).

The French, also in WWII, considered using rinderpest virus to infect cattle. The Japanese used aerial dissemination in an attempt to spread anthrax and glanders, although with only limited success. Great Britain attempted to weaponize anthrax, FMD, and plague as early as 1937 (Ban 2).

The Soviet Army used glanders against Afghanistan military forces during the Soviets' attempt to control that country during the early 1980s. The disease is endemic in Africa, Asia, the Middle East, and Central and South America. No naturally transmitted cases of glanders have been reported in the U.S. since the 1940s. Horses, mules, donkeys, goats, dogs, and cats are susceptible to infection. In earlier wars, horses were carriers of the disease, and humans were infected due to their contacts with infected animals. The Japanese used the disease against the Chinese in World War II ("Burkholderia mallei," par. 4).

Many Americans are unaware of the global nature of our economy. Because of the globalization of agriculture, the speed with which products reach the markets is increasing. With the increase in speed, our ability to detect and stop diseases at our borders is under increasing pressure. Those who wish to harm the U.S. understand this phenomenon. During recent military operations in Afghanistan, U.S. personnel discovered that al-Qaeda operatives have a strong interest in the U.S. agricultural sector, including the use of poisons, diseases, and other biological weapons. Traces of anthrax were found in labs in Afghanistan (Lumpkin, par. 4).

Vulnerability

The United States is vulnerable to intentional efforts to undermine its agriculture industries, either by the deliberate tampering of food during production or through the release of a biological agent, resulting in animal or plant disease. However, agricultural targets are not limited to animals or plants; they can also include the following:

- Transportation systems
- Water supplies
- Grain elevators or other storage facilities
- Producers, farmers, and farm workers
- Restaurants and food handlers
- Grocery stores
- Food and agriculture research laboratories
- Packing and processing facilities

If any one of these commodities was significantly impacted by a bioterrorist event, the results could be catastrophic, but the impact of a devastating attack on our food supply would not be limited just to the farmer; businesses such as farm suppliers, transportation, grocery stores, restaurants, equipment distributors, and in the end, consumers all pay the price. Small towns could potentially be wiped out, placing the supply of our food in peril, perhaps for a long time.

Targeting the Food Supply

An attack against animals or crops is generally viewed as more benign and less offensive than if humans fell dead from a direct assault. Agricultural terrorism is not about killing animals; it is about crippling an economy. To that end, agents foreign to U.S. livestock/poultry industries and crops would be preferred by terrorists.

For animals, there are many foreign agents readily available in nature, from low-security laboratories, even from commercial sources, that require little effort or risk to smuggle in. Most foreign animal agents pose no risk to human health, so the terrorist may feel some sense of security in handling and dispersing these pathogens. Once released, an agroterrorism event may go unnoticed for days to weeks, and by then, it may be nearly impossible to determine if the event was manmade or occurred naturally.

Biosecurity

The poor level of biosecurity on the majority of farms today guarantees unchallenged and unhindered access to the determined, patient terrorist. Few farmers or producers quarantine their new animals—the same animals that were just purchased at a crowded sale barn.

Agroterrorist Agents

An effective agent that could be used against animals is a highly contagious virulent that is able to survive well in the environment and can result in economic hardship, creating an import ban by other countries; therefore, animal diseases could cost America billions. Foot and Mouth Disease (FMD), Hog Cholera, Velogenic Newcastle Disease, African Swine Fever, Highly Pathogenic Avian Influenza (HPAI), and Rinderpest might fulfill some, if not most, of the above criteria. It is estimated that if FMD became established within the U.S. that it would cost the nation over \$27 billion in trade losses alone each year. Add to this the costs of depopulating infected herds, disinfecting premises, quarantines, surveillance, higher prices of meat, and the result is a substantial price to the economy.

Agricultural Threats

The threat to American agriculture can be divided into three groups—plant pathogens, animal pathogens, and zoonotic pathogens. There are many agricultural pathogens of concern; however, only a few representative examples will be discussed in this module. Within the livestock-disease category, there are approximately 150 diseases of concern.

Animal Pathogens

Foreign Animal Diseases (FAD) have had dramatic consequences for the countries affected during recent years. Beginning in late February 2001, an outbreak of FMD spread through the U.K. and, to a lesser degree, France, Ireland, and the Netherlands. It was suspected that the unprecedented speed and extent of the spread was caused by the movement of infected animals, principally sheep, and through contact with contaminated vehicles used to ship the animals.

By December 2001, almost four million animals had been slaughtered to contain and dispose of animals infected with FMD; some estimate the number at 20 million (Apatow, par. 1). The impact of a disease event involving livestock is not restricted to the food-production sector of the economy. During the disease outbreak, tourism, restaurant patronage, and beef and dairy consumption all posted significant declines. The U.K.'s beef export industry nearly disappeared. The economic impact on the U.K. from the outbreak is estimated at more than £10 billion (Moore, par. 19).

Diseases of this nature have been weaponized by both the U.S. and the former Soviet Union. The technology and the knowledge for developing these types of weapons are available. The interest on the part of al-Qaeda operatives in agricultural diseases is prompting the U.S. to make significant investments in readiness activities for the U.S. livestock- and crop-production sectors.

Animal pathogens that have been weaponized or pursued for weaponization potential include, but are not limited to, the following:

- African Swine Fever
- Anthrax
- FMD
- Hog Cholera/Classical Swine Fever
- Ornithosis/Psittacosis
- Rinderpest
- Trypanosomiasis
- Poxvirus (FEMA E-16)
- Ebola Virus
- Marburg Virus
- Rift Valley Virus
- *Bacillus anthracis*
- *Burcella melitensis*
- *Burkholderia mallei*
- *Francisella tularensis*
- *Yersinia pestis* (HHS and CDC, "Table 1," 1-8)

The most successful and innovative agriculture biological warfare program was created by the former Soviet Union, experimenting with a number of animal pathogens. The Soviets successfully used ticks to transmit FMD and avian ticks to transmit ornithosis to chickens (Ban 3). The following are believed to have been weaponized by the former Soviet Union:

- African Swine Fever
- Anthrax

- Avian Influenza (AI)
- Brown Grass Mosaic
- Brucellosis
- Contagious Bovine Pleuropneumonia
- Contagious Ecthyma (sheep)
- FMD
- Glanders
- Maize Rust
- Newcastle Disease
- Potato Virus
- Psittacosis
- Rice Blast
- Rinderpest
- Rye Blast
- Tobacco Mosaic
- Venezuelan Equine Encephalitis (VEE)
- Vesicular Stomatitis
- Wheat and Barley Mosaic Streak
- Wheat Stem Rust (FEMA E-16)

Zoonotic Diseases

Zoonotic diseases are those shared by animals and humans, and those transferred from animals to man or from man to animals. Approximately 150 such diseases are known to exist (“Health Concerns to be Aware of When Working with Wildlife [a.k.a. —Zoonoses],” par. 1).

Zoonotic diseases represent a class of diseases of concern to the U.S. public and animal health sectors. The recent emergence of West Nile Virus (WNV) underscores America’s vulnerability to the spread of zoonotic diseases, and the relative inability to contain such a disease once it becomes embedded in a wild animal population.

It is important to realize that agricultural diseases are extremely robust in their natural environment. They have evolved to remain viable in the environment for many months in spite of exposure to ultraviolet light, heat, dry conditions, etc.

An agricultural-disease event is a biological event. Events involving food adulteration or contamination tend to affect a limited region or product category (e.g., meat cold cuts, salad materials, etc.). An agricultural-disease event will have its own unique characteristics and may spread over a wide area or affect several areas at one time. For example, there may be a need to employ predictive epidemiological surveillance, predicting where a disease is likely to appear, and focus key surveillance and detection efforts to confirm or deny the presence of a disease.

A troubling component of an agricultural-disease event is the initial lack of knowledge regarding the source of the disease agent and whether the source was deliberate, accidental, or of natural origin. That information may not be known for days or weeks following the disease outbreak. Investigation into the origin of the disease, from a law enforcement standpoint, will likely occur along with the disease-response activities.

An outbreak of Avian Flu, categorized as Influenza A (H5N1), was reported in several countries throughout Asia. Cases were confirmed in birds in Cambodia, China, Hong Kong, Indonesia, Japan, Laos, Pakistan, South Korea, Thailand, and Vietnam. Although that particular strain of AI has not been detected in the U.S., the outbreak in Asia has resulted in the killing of more than 25 million birds. Similar (but not identical) strains of the virus were found in 2004 in Pennsylvania, Delaware, and Texas (Dept. of Labor and Occupational Safety and Health Administration [OSHA], par. 1). Avian Influenza appears as both high pathogenic and low pathogenic syndromes. What has appeared in the U.S. are low-pathogenic strains of the disease.

Influenza is not a single virus, but is a category of numerous viruses that constantly change, or mutate, to create viruses with new properties. The virus that infects humans can interact with the virus of the avian type to produce a virus type capable of transmission between humans, in which humans have little, if any, immunity.

In the agricultural setting, the influenza virus can be carried by animal manure to the soil, where it is further spread by dust, farm equipment, cages, shoes, or other animals (Dept. of Labor and OSHA, par. 7).

Isolation of agricultural diseases is difficult even under the best of situations. Disease spread is affected by personnel and vehicular movement through a contaminated area. The infected animals themselves, particularly in a viral-disease event, shed billions of viral particles per day; thus, they serve to further contaminate the operational area.

Boundaries of the containment area will span roads, waterways, and jurisdictional lines, complicating command and control of isolation and containment activities. Keep in mind that a great deal of confusion can occur regarding quarantine authority between federal and state levels. Simply put, federal quarantine restricts the movement of animals between states and countries, whereas state quarantine laws can restrict the movement of an animal within the state, a county, and even a particular farm. Knowledge of these laws is critical to legally based and effective enforcement of quarantine measures.

In the response plans at the local and state level, an agriculture annex should be included, with a complete and current call-up roster of qualified responders. Furthermore, an agricultural event will serve as a reminder for the notification of federal assets such as the EPA, USDA, the Federal Bureau of Investigation (FBI), and others. The identities of local representatives of the various agencies should be included in plans and should be well known before an event occurs.

Indicators of an Agricultural Event

The indicators of an agricultural event involving the health of humans might not appear for days or weeks. There may be patterns to alert healthcare providers, veterinarians, and other public health professionals to the presence of an infectious-disease outbreak associated with an intentional release of a biological agent. These include the following:

- Unusual clustering of illness or mortality in a given geographic region or within a short amount of time for large numbers of people or animals. This may include abnormal or atypical, unexplained symptoms
- Normally healthy individuals becoming suddenly ill
- Symptoms occurring in an area where a particular disease is extremely rare
- An unusual age distribution for common diseases
- A disease occurring outside its typical season (Moore, par. 6)

Initially, it might not be known whether the outbreak of a disease has been caused by nature or intentional acts. Universities, veterinary facilities, and contract research laboratories are prime locations for disease agents involved in the misdirection or accidental release of animal and plant diseases, as well as individuals with knowledge of how to make or spread them. Responders should be familiar with potential sources of agents that would account for accidental outbreaks of disease, or even intentional releases within their jurisdictions. Regardless of the nature of the disaster or response, it is important to always consider the animal and agricultural aspects of any

incident. Animals and agriculture may be impacted by any event; for example, a hurricane may disrupt normal regulatory activities, such as closure of ports of entry.

The challenge for Extension Agents is to become aware of the threats to our food supply that can and do exist. Working with a wide diversity of clientele, having a presence in each of Tennessee's 95 counties, and being respected and recognized as educators within the community, places Extension personnel in a position to provide a unique perspective on the dangers and threats to our food supply system. Extension is an active part of every community in this state. Agents live, work, shop and interact in hundreds of ways each and every day with literally thousands of Tennessee residents. It is this close interaction with families, businesses, farms, schools, local governments, and virtually all other phases of daily life, which provide Extension with the opportunity to help insure that our food system remains safe and secure.

References

- “Agricultural Bioterrorism: A Federal Strategy Report to Meet the Threat.” Washington, D.C.: GPO, 2003. 16 Dec. 2005 <http://www.ndu.edu/inss/McNair/mcnair65/01_toc.htm>.
- Apatow, Stephen M. “Impact of the Foot and Mouth Epidemic on the Equestrian Industry in the UK—A Reference Point for the United States.” Humanitarian Resource Institute. Dec. 2001. 9 Sept. 2005 <<http://www.humanitarian.net/biodefense/papers/FMDEI-2001-12.html>>.
- Ban, Jonathan. “Agricultural Biological Warfare: An Overview.” *The Arena*. Jun. 2000. 31 Jan. 2006 <<http://www.mipt.org/pdf/agrobiowarfareoverview.pdf>>.
- “*Burkholderia mallei*.” n.d. 9 Sept. 2005 <http://pathema.tigr.org/pathema/b_mallei.shtml>.
- Carus, W. Seth. *Bioterrorism and Biocrimes: The Illicit Use of Biological Agents Since 1900*. Washington: Center for Counterproliferation Research, National Defense University, 2001.
- Casagrande, Rocco. “Terrorism on the Hoof: Livestock as a Bioterrorism Target.” *Focus on Agriculture and Food Terrorism*. Ed. Sally O’Neal Coates. Special Edition of *Agrichemical and Environmental News* 187 (Nov. 2001). 23 Aug. 2005 <<http://aenews.wsu.edu/Nov01AENews/Nov01AENews.htm>>.
- Davis, Radford G. “Agricultural Bioterrorism.” ActionBioScience.org. Oct. 2001. 8 Sept. 2005 <<http://www.actionbioscience.org/newfrontiers/davis.html>>.
- “Health Concerns to be Aware of When Working With Wildlife (a.k.a.—Zoonoses).” University of Minnesota. 26 June 2003. 12 Sept. 2005 <<http://www.tc.umn.edu/~devo0028/zoonos.htm>>.
- Jackson, LeeAnne. “Terrorists at the Table: FDA Looks at Food Bioterrorism.” *Focus on Agriculture and Food Terrorism*. Ed. Sally O’Neal Coates. Special Edition of *Agrichemical and Environmental News* 187 (Nov. 2001). 23 Aug. 2005 <<http://aenews.wsu.edu/Nov01AENews/Nov01AENews.htm>>.
- Lumpkin, John J. “U.S. Again Underestimated Al Qaeda.” *War on Terror*. 7 Jan. 2003. 9 Sept. 2005 <<http://www.cbsnews.com/stories/2003/01/07/attack/main535590.shtml>>.
- McKenzie, Kenneth F. “What is Asymmetric Warfare?” *The Revenge of the Melians: Asymmetric Threats and the Next QDR*. Washington, DC: GPO. Nov. 2000. 6 Sept. 2005 <<http://www.ndu.edu/inss/McNair/mcnair62/CH01.html>>.
- Moore, David H. “Zoonotic Diseases, Bioterrorism and Agroterrorism: Prevention by Preparedness.” *The ASA Newsletter*. 2002. 12 Sept. 2005 <<http://www.asanltr.com/newsletter/04-4/articles/044a.htm>>.

- Nolen, R. Scott. "Exotic Newcastle Disease Strikes Game Birds in California." *Journal of the American Veterinary Medical Association*. 15 Nov. 2002. 15 Sept. 2005 <<http://www.avma.org/onlnews./javma/nov02/021115b.asp>>.
- Parker, Henry S. *Agricultural Bioterrorism: A Federal Strategy to Meet the Threat*. Washington: GPO, 2003.
- "Rice Blast." Rice Doctor. n.d. 15 Sept. 2005 <http://www.knowledgebank.irri.org/riceDoctor_MX/Fact_Sheets/Diseases/Rice_Blast.htm>
- "The United States Government Weeds Out Doctors." *Health Care Issues*. National Center for Policy Analysis. 2001. 15 Sept. 2005 <<http://www.ncpa.org/health/pdh31.html>>.
- United States. Centers for Disease Control and Prevention. "Bioterrorism Agents/Diseases." *Emergency Preparedness and Response*. 19 Nov. 2004. 7 Sept. 2005 <<http://www.bt.cdc.gov/agent/agentlist-category.asp>>.
- United States. Centers for Disease Control and Prevention. "Laboratory Biosafety Level Criteria." BMBL Section III. 30 Nov. 2000. 7 Sept. 2005 <<http://www.cdc.gov/od/ohs/biosfty/bmbl4/bmbl4s3.htm>>.
- United States. Centers for Disease Control and Prevention. "Overview of West Nile Virus." *West Nile Virus*. 26 Apr. 2004. 15 Sept. 2005 <<http://www.cdc.gov/ncidod/dybid/westnile/qa/overview.htm>>.
- United States. Centers for Disease Control and Prevention. "Table 1. Summary of Recommended Biosafety Levels for Infectious Agents." n.d. 7 Sept. 2005 <<http://www.cdc.gov/od/ohs/biosfty/bmbl4/bmbl4s3t.htm>>.
- United States. Department of Agriculture. "Disease-Related Trade Restrictions Shaped Animal Product Markets in 2004 and Stamp Imprints on 2005 Forecasts." *Electronic Outlook Report from the Economic Research Service* by Don P. Blayney. 5 Aug. 2005. 6 Sept. 2005 <<http://www.ers.usda.gov/Publications/LDP/Aug05/ldpm13301/>>.
- United States. Department of Agriculture. "Karmal Bunt: A Fungal Disease of Wheat." *Plant Protection and Quarantine*. Mar. 2004. 26 Jan. 2006 <<http://www.aphis.usda.gov/research/atlas02/pdf/02-moo1-RGBDot1-largetext.pdf>>.
- United States. Department of Agriculture. *2002 Census of Agriculture*. 2004. 9 Sept. 2005 <<http://www.nass.usda.gov/research/atlas02/pdf/02-moo1-RGBDot1-largetext.pdf>>.
- United States. Federal Emergency Management Agency. "Appendix E. Agriterrorism." *Toolkit for Managing the Emergency Consequences of Terrorist Incidents*. 2002. 6 Sept. 2005. <http://fema.gov/pdf/onp/toolkit_app_e.pdf>.

United States. Department of Labor, Occupational Safety and Health Administration. "Guidance for Protecting Workers Against Avian Flu." n.d. 31 Aug. 2005 <<http://www.osha.gov/dsg/guidance/avian-flu.html>>.

"Velogenic Newcastle Disease." *Foreign Animal Diseases*. n.d. 12 Sept. 2005 <http://www.vet.uga.edu/vpp/gray_book/FAD/vnd.htm>.

Wegner, Marguerite. "The New Zealand Story." *Rabbit Hemorrhagic Disease Outbreak in Iowa in April 2000*. n.d. 6 Sept. 2005 <<http://www.linkny.com/~civitas/page246.html>>.

