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Agroterrorism: Options in Congress

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Summary

Although U.S. intelligence agencies have not identified any terrorist acts targeting agricultural production (i.e., agroterrorism) in the United States to date, the events of September 11, 2001 have awakened the nation to their possibility. Some experts estimate that a single agroterrorist attack using a highly contagious livestock disease could cost between $10 billion and $30 billion to the U.S. economy. Experts also recognize weaknesses in the ability of most nations to prevent and contain a biological attack on their agricultural resources. Limited inspection capabilities, lack of rapid diagnostic tools, inadequate coordination between inspection agencies, and little biosafety training of farmers, agronomists, and veterinarians are among the recognized weaknesses.

The goal of agroterrorism is to cripple the biological infrastructure of a nation's agriculture, i.e., its livestock and its crops. Many links in the agricultural production chain are potentially susceptible to attack with a biological weapon. Traditionally the first defense against the introduction of livestock or plant diseases has been to try to keep them out of the country by stopping them at our borders. However, if an agroterrorist attack were to occur, keeping the disease from inflicting significant economic damage will depend on quick actions from alert and informed farmers and disease specialists.

Congress and the Administration are engaged in discussions to protect agricultural production from a terrorist attack, to promote greater awareness and rapid response. In the aftermath of September 11, the United States Department of Agriculture (USDA) has gained a seat at the new Office of Homeland Security and has increased the number of inspectors at ports-of-entry.

In Congress, as of December 2001, fifteen proposals address agroterrorism prevention by:

- Upgrading USDA and state research laboratories to handle new emerging diseases and increase diagnostic capacity;
- Strengthening security around research laboratories that handle hazardous pathogens;
- Supporting federal, state and private research that addresses prevention, detection, and control of agroterrorist attacks; and
- Improving federal inspection procedures and interagency coordination at ports-of-entry.

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Introduction

People more generally associate the idea of bioterrorism with outbreaks of human illness, rather than with animal or plant destruction, or with economic loss and market disruption. However, the potential use of terrorism against agricultural targets (i.e., agroterrorism) has increasingly captured the attention of national security analysts, especially after the end of the Cold War. Until recently, the use of biological weapons by terrorists was regarded largely in theoretical terms, because their use was thought improbable without the technical assistance of one of a handful rogue states. The events of September 11, 2001, and the deadly anthrax attacks which followed, have brought bioterrorism into the realm of possibility.

Attacks against agriculture are as old as war itself. In modern warfare practice, however, the use of biological weapons against agricultural targets has remained mostly a theoretical consideration. In fact, biological weapons have rarely been used against crops or livestock despite extensive research devoted to this possibility in the past – particularly during World War II and the immediate aftermath, when several countries, including the United States, developed crop and livestock diseases as weapons of mass destruction. With the ratification of the Biological and Toxin Weapons Convention[1] in 1972, the United States stopped military development of biological weapons and destroyed stockpiles over the following decades.

Even though there have been no reported attacks to crops or livestock few government agencies or private sector enterprises are taking the prospect for granted since September 11. For example, a report by the Gilmore Commission on terrorism noted that "... a biological attack against an agricultural target offers terrorists a virtually risk-free form of assault, which has a high probability of success and which also has the prospect of obtaining political objectives, such as undermining confidence in the ability of government or giving the terrorists an improved bargaining position."[2]

The potential for economic damage from an agroterrorist attack depends on a number of factors, such as its geographical spread, the disease agent, the location of the attack, how long it remains undetected, and its economic target. Cost estimates vary accordingly. For example, a 1999 University of California study estimated that the cost of a foot and mouth disease (FMD) outbreak in that state could range

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[1] The United States signed this convention10 April 1972 and ratified on 26 March 1975.

[2] Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction. Second Annual Report to the President and Congress. *Toward a National Strategy for Combating Terrorism*. December 15, 2000. 191p.

between $6.6 and $13.5 billion, depending on the severity of different scenarios.[3] USDA officials estimate that a single agroterrorist attack on the livestock industry using a highly infective agent, for example, could cost the U.S. economy between $10 billion and $30 billion. The country is not alone in being vulnerable to attack. Experts recognize weaknesses in the ability of most nations to prevent or cope with biological attacks on their agricultural production. Limited border inspection capabilities, absence of rapid detection and diagnostic tools, lack of vaccines or control techniques, poor coordination between border inspection agencies, and poor biosafety training of farmers, agronomists, veterinary corps and regulators are among the reported weaknesses.

At the same time, U.S. agriculture's response to accidental and naturally occurring agricultural threats over the past 10 years, observers note, has already established a solid base on which to build defenses against any deliberate introduction of a plant or animal pathogen. The 2001 FMD outbreak in the United Kingdom, France and in the Netherlands has placed federal, state and local authorities in the highest state of alert seen in decades. To guard against th accidental entry of FMD, for example, the U.S. Department of Agriculture (USDA) added hundreds of new inspectors at ports of entry, and engaged in an aggressive public awareness campaign about travel to and from FMD countries. State and local government officials have tightened disease surveillance networks and the physical security of biological resources (such as animal disease research labs) that could be at risk. Biosecurity is a priority interest among farmers, food manufacturers and retailers nationwide. They may be the first line of defense against an act agroterrorism.

This report examines the potential threats to America's agriculture from a deliberate biological attack, describes the current defense structure and capabilities available to respond to agroterrorism, and analyzes current congressional proposals to address the threat of biological weapons to U.S. agriculture.

Economic Impacts

The goal of agroterrorism would be to damage a nation's livestock and its crops. Consequences of such an attack could be felt in two ways:

- **Direct economic losses** resulting from lost production, the cost of destroying disease-ridden crops and livestock, and the cost of disease containment measures, such as drugs, diagnostics, vaccines, pesticides and veterinary services. For example, conservative cost and loss estimates from the 1983 U.S. outbreak of avian influenza show eradication costs of $70 million and market losses of $350 million for the U.S. poultry industry; and

- **Indirect costs and multiplier effects** from dislocations in agricultural sectors dependent on agriculture (feed and inputs industry, transportation, retail) and from the loss of export markets (as trading partners exercise their rights to quarantine or embargo targeted U.S. agricultural products under various trade

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[3] Ekboir, J.M. 1999. Potential impact of foot-and-mouth disease in California. Agricultural Issues Center. University of California. v, 80p.

agreements). In the UK, for instance, the recent outbreaks of bovine spongiform encephalopathy (BSE, or 'mad cow' disease) and FMD have had a combined cost to government of $17 billion in compensation paid to farmers, laid-off livestock and related industry employees, and export market loss.

Scale of Impacts. Livestock production is the single largest segment of U.S. agriculture with populations of over one billion poultry, 100 million cattle, 60 million hogs and pigs, and 7 million sheep. According to the USDA Economic Research Service, domestic U.S. meat and dairy sales surpassed $70 billion in 2000, and represent over half of U.S. agricultural output. In 2000, the United States sold $2.9 billion in beef and veal, $1.2 billion in fresh or frozen pork, and $1 billion in dairy products to trading partners. Four countries buy 95% of U.S. beef exports. Japan is the principal buyer ($1.1 billion), followed by Mexico ($533 million), Korea ($398 million), and Canada ($253 million). Similarly, Japan ($588 million), Mexico ($302 million) and Canada ($138 million) are the largest buyers of U.S. pork.

Domestic production in wheat, corn, soybeans, feed grains, and rice covers more than 200 million acres with total sales surpassing $37 billion in 2000. In 2000, U.S. exports of grains and feeds, oilseeds, fruits and vegetables were $26.6 billion.

If an FMD outbreak occurred in the United States every livestock-related agricultural sector would feel the impact. According to industry officials, every other bushel of U.S. grain goes to animal feed. A significant drop in demand for feed (caused by extensive cattle and swine herd depopulation) could further depress grain prices, currently at historically low levels. Conversely, any attack on grain production could reduce supply, drastically increase grain imports and, consequently elevate feed and food prices. Agricultural input industries (e.g., veterinary medicines, agrochemicals), and marketing and distribution segments (e.g., stockyards, packers, distributors, and retailers) could be negatively impacted by an outbreak, as well. The American Farm Bureau Federation reports that an FMD outbreak in the United States could cost nearly $12 billion just to deal with the direct consequences of the crisis. USDA officials generally agree with the magnitude of this estimate.

The psychological impact on the general public of an agroterrorist attack would also have economic consequences. Dr. Roger Breeze, of the USDA's Agriculture Research Service (ARS)[4], says the fact that the United States has not experienced a major cattle or sheep epidemic in the era of television is extremely important in this regard, as it effectively means that "no visual point of reference has been available to prepare the public for the consequences of containing such an occurrence."

The Targets of Agroterrorism

Why is agriculture an attractive target? On October 27, 1999, Dr. Floyd Horn, USDA/ARS Administrator, testified before the Subcommittee on Emerging Threats of the Senate Armed Services Committee that American agriculture is "...by virtue of its efficiency and its trends toward concentration, vulnerable to an agricultural bioterrorism incident." According to Dr. Horn, the current poor state of

[4] ARS is USDA's in-house scientific research and development agency.

U.S. rapid detection capabilities offers an agroterrorist a great potential for a surprise biological attack to agriculture. The following reasons are given by experts to potentially explain why agriculture may be an attractive target of terrorism:

- There are many more lethal and highly contagious biological agents affecting animals than there are affecting humans. In addition, these diseases, such as FMD, are usually not harmful to the terrorists or saboteurs themselves. Terrorists seeking to sabotage an agricultural commodity can select among several economically valuable targets, match the target crop/livestock against a published list of diseases, and select the most accessible to their means. Finally, many of these diseases appear to be environmentally resilient and are reasonably easy to acquire, produce and deploy;

- The intensive way in which U.S. livestock and crops are currently grown, bred, and transported has largely circumvented natural barriers that could slow pathogenic dissemination. The modern structure of concentrated livestock industries separates breeding from finishing operations, uses highly genetically homogeneous livestock and crops, and requires large-scale geographical movements of animals in short order to satisfy production demands;

- The mere presence, or even the rumor, of an "internationally quarantineable" pest or disease would in all likelihood stop all exports of that commodity from the United States, and have a significant effect on the economy. Likewise, a state of heightened 'awareness' or security would force expenditures on farmers that could raise costs of production; and

- Success in keeping livestock diseases out of the United States, sometimes for many decades, means that many producers and veterinarians lack the expertise needed to quickly recognize their symptoms in case of an outbreak. In addition, the fact that livestock are not usually vaccinated against these diseases means that animals may be susceptible, and sufficient vaccine stocks may not be available in case of an outbreak.[5]

Livestock vs. Crop Targets. A widely accepted view among scientists is that livestock herds are much more susceptible to agroterrorism than crop plants. Much of this has to do with the success of efforts to systematically eliminate animal diseases, such as FMD and classical swine fever, from U.S. herds. In contrast, a number of plant pathogens continue to exist in small areas of the United States or continue to infect small numbers of plants each year, making outbreaks and their control something of a routine. Moreover, plant pathogens are much more technically difficult to manipulate. A would-be terrorist would be unlikely to overcome the myriad biological conditions needed that would make plant pathogens grow and prosper. Plant pathologists state that even a skilled practitioner, in trying to create disease in a field, frequently finds the natural environment somewhat uncooperative.

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[5] In some instances, as in the case of a possible FMD outbreak, vaccination will not be the preferred course of action because tests designed to differentiate vaccinated animals and silent carriers do not exist. Thus trade rules will allow resumption of exports from a non-vaccinating country quicker than from a country that has not resorted to mass vaccinations.

The Threats. Experts also agree that of the hundreds of pathogens and insect pests available to an agroterrorist, perhaps fewer than a couple of dozen represent significant economic threats. What determines this level of threat is the agent's contagiousness and potential for rapid spread, and its international status as a "reportable" pest or disease (i.e., subject to international quarantine). For example, widespread animal diseases like brucellosis, influenza and tuberculosis receive less international attention than diseases such as FMD, hog cholera, or Newcastle in poultry. These latter diseases are recognized by the International Office for Epizootics (OIE)[6] as part of "List A" diseases, which consists of the most feared livestock diseases worldwide (See Table 1). The OIE also keeps a "List B" which lists actionable (i.e., quarantineable) diseases but ranks them as lower threats to animal health or trade. List "B" also contains well known livestock diseases, such as anthrax; and emerging diseases, such as Nipah virus[7], which according to some specialists could be elevated to List "A" in the future.

In addition, new animal diseases are emerging around the world that need scientific attention. Of most concern are so-called "zoonotic" diseases, capable of infecting humans as well as animals. Some can be lethal and no vaccine or other protection is currently available against them. Examples include Hendra virus, Nipah virus, and the highly pathogenic avian influenza virus strain H5N1 that appeared in Hong Kong in 1997. There are currently no animal research facilities equipped to study these diseases in the United States. Animal research on these diseases would require additional biosafety protections to safeguard the researcher's health, such as biosafety level-4 facilities (BL-4).[8]

Unlike the situation with livestock, there is no agreed-upon list of plant pathogens or insects most likely to be used by terrorists, or even of agents likely to do the most damage to American agriculture. USDA regulates and lists hundreds of actionable foreign plant diseases and insect pests. Experts have identified some pathogens that could be used by terrorists. Among them are wheat rust and soybean rust, which is a fungal disease that is not known to exist in the continental United States, but common in other countries. Wheat rust has been "weaponized" in some countries, and there is some concern that the same could be done with soy bean rust. Other potential plant pathogens that could be used to cause economic damage include citrus greening, citrus canker, Karnal bunt, Philippine downy mildew, citrus black

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[6] OIE is the office of the World Heath Organization in charge of serving as an information clearinghouse for animal diseases and health, including their worldwide status, and other technical and trade related information.

[7] Nipah virus is a new disease of pigs discovered in the Malaysian peninsula in October 1998. It has led to the death, by encephalitis, of more than one hundred people who had come into contact with infected pigs. The 'Nipah' virus was identified as the etiological agent. Serological tests indicated that a fruit-eating bat of the *Pteropid* genus could be the reservoir. More than one million infected or exposed pigs have been slaughtered and movements of other animals living in the infected zone were suspended.

[8] 'Biosafety levels,' or "BL" give guidance to researchers about the potential risk of pathogens contained within laboratories. BL-1 laboratories handle pathogens of minimal hazzard to humans or the environment; while BL-4 laboratories handle dangerous agents with a high risk of aerosol-transmission to humans, and life-threatening diseases.

spot, rice bacterial leaf streak, rice blast, and potato wart. Insect threats number in the hundreds, but fruit flies (including Mediterranean fruitfly) and various insects that spread specific plant diseases are at the top of the list.[9]

Defenses Against the Threat of Agroterrorism

Every link in the agricultural production chain is susceptible to attack with a biological weapon. Traditionally the first defense against the introduction of livestock or plant diseases has been to try to keep them out. Agricultural quarantine inspectors at pre-clearance inspections at ports of embarkation and at the U.S. borders are the first line of defense.

However, if a foreign disease were introduced, the second line of defense lies with farmers, producers, veterinarians, plant pathologists and entomologists. Most agree that effectiveness depends on a heightened sense of awareness, and on the ability to rapidly determine the level of threat (e.g., like having rapid disease diagnostic tools). Lessons from disease outbreaks, including the recent FMD outbreaks in Europe, show that the speed of detection, diagnosis, and control spell the difference between an isolated incident and an economic disaster. In an outbreak, economic damage is proportional to the time it takes to first detect the disease. Clearly, if there is a delay in diagnosis, and an epidemic is allowed to get a foothold, then one farm's problem may become everyone's nightmare.

Another line of defense is biosecurity[10], or the use of preventive measures on the farm, as an integral part of agricultural production systems. New attitudes are now evident in farm country. Most farm specialists agree that livestock farmers are increasingly aware of the importance of biosecurity measures, particularly since the FMD outbreaks in Europe. Signs of "*Biosecure Area*" on fences and barns are now common sights, and more farm operators are requiring visitors to wear boot covers to guard against bringing in disease.

Farm organizations, such as the Farm Bureau, and USDA are urging farmers and ranchers to take extra precautions in allowing people to come onto their property. Among the common precautions are: (1) not to allow visitors on the farm; (2) clean up between groups of livestock; (3) monitor animals for signs of disease; (4) isolate all new herd introductions for signs of disease; and (5) use of perimeter fences to keep vehicles off the farm. According to Dr. Phillip Clauer, of Pennsylvania State University, the use of modern biosecurity measures had its roots in the 1980's when outbreaks of avian influenza forced industry to look at how to eliminate vulnerabilities to this disease. Most experts agree that while biosecurity measures have been a standard feature of contract poultry and swine operations for over a decade, some

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[9] On December 5, 2001, USDA suspended the entry of clementine citrus from Spain because live Mediterranean fruit fly larvae were found in Spanish clementines in Louisiana, Maryland and North Carolina.

[10] *Biosecurity* is commonly defined as: (1) the use of farm management practices that protect animals and crops from the introduction of infectious agents; and (2) the rapid containment of a disease that prevents its spread within a herd or flock, or to other farms.

Table 1. List "A" of Animal Diseases from the World Health Organization's "Office International Des Epizooties"

Disease	Livestock	Last U.S.. Report	Vaccine	Laboratory Diagnosis time	Research in U.S. or Expertise	Mode of Infection
Foot and Mouth Disease (virus)	Cattle, swine	1929	Yes	5hrs	Yes (Plum, Is.)	Contact, infected garbage, humans
Swine vesicular disease (virus)	Swine	never	None	5hrs	Yes (Plum Is.)	Contact, fecal contamination
Bluetongue (virus)	Ruminants	1999 (endemic)	Yes	5hrs	Yes (Ames, IA, Laramie, WY)	Needs insect vector
African Horse Sickness (virus)	Equines	never	Yes	5hrs	Yes (Ames, IA.)	Needs insect vector
Classical Swine Fever (Hog cholera virus)	Swine	1976	Yes	3hrs	Yes (Plum Is., Ames, IA.)	Contact with sick animals
Newcastle Disease (virus)	Fowl, birds.	1998? (1974)	Yes	Less than 12hrs	Yes (Athens, Ga)	Direct contact, tainted water, feed, and feces
Rinderpest (virus) & Peste des Petits Ruminants	Cattle, swine	never	Yes	2-5 days	Yes (Plum Is.)	Contact with sick animals
Contagious bovine pleuropneumonia (mycoplasma)	Cattle	1892	Yes	2 weeks	Limited	Contact with sick animals (agent not easily grown)
Rift Valley Fever (virus)	Many animals	never	Yes	5hrs	Yes (Plum, Is.)	Insect vector, direct contact
Sheep pox/goat pox (virus)	Sheep and goats	never	Yes	3hrs	Limited	Contact
African Swine Fever (virus)	Swine	never	None	3hrs	Yes (Plum Is.)	infected garbage, human,, ticks
Highly Pathogenic avian influenza (virus)	Poultry, fowl	1984	No	Less than 12hrs	Yes (Ames IA; CDC Athens, Ga. H5N1)	Contact, water, feed, and feces

farmers, especially in smaller non-contract operations, are just learning about the need for and costs of adopting these measures.

Finally, the last line of defense, and the costliest, is the isolation, control and eradication of an epidemic. The more geographically widespread a disease outbreak, the costlier and more drastic the control measures may have to be. Valuable models come from current agricultural disease outbreaks, such as FMD in the UK, citrus canker epidemic in Florida, and Karnal bunt of wheat in Texas. Each one of these epidemics has required the depopulation and destruction of livestock (FMD) and crops in quarantine areas, indemnity payments to farmers and growers, and immediate suspension of trade. In addition, actions taken in each of these outbreaks have met with varying degrees of resistance from groups opposed to mass slaughter of animals, or from farmers who fear the loss of their livelihood. Further, canker eradication efforts in Florida neighborhoods illustrate how science-based measures have been challenged and delayed in courts of justice, or how farmers may show reluctance to voluntarily test their wheat fields for Karnal bunt, or sheep herds for scrapie. It seems clear that of all lines of defense, this one is the most politically sensitive and difficult.

USDA Agencies. Federal responsibilities to protect against acts of agroterrorism fall primarily with USDA agencies. Primary authority to protect agriculture and assure the safety of meat, poultry, and egg products is given to USDA's Animal and Plant Health Inspection Service (APHIS) and the Food Safety Inspection Agency (FSIS), while the Agricultural Research Service conducts research and development of countermeasures and diagnostic tools. Overall coordination of emergency actions in case of an accidental introduction or deliberate attack rests with the newly created Office of Crisis Planning and Management (OCPM).

OCPM. The Office of Crisis Planning and Management is a department-level office under the Assistant Secretary for Administration. The office is responsible for coordinating activities on terrorism across USDA and with other federal agencies, including FEMA. The office also coordinates USDA's role in the Federal Response Plan, under the Office for Homeland Security.

APHIS. The Animal and Plant Health Inspection Service is responsible for protecting U.S. agriculture from foreign pests and diseases. Serving as the first line of defense to prevent pest and disease agents from entering the United States, this agency is charged with inspections of aircraft, ships, cargo, passengers and baggage at U.S. ports of entry. Funding for inspections comes primarily through the collection of Agricultural Quarantine Inspection (AQI) user fees. AQI fees were authorized under §2509(a) of the Food, Agriculture, Conservation and Trade Act of 1990 (21 USC 136a).

APHIS is also responsible for establishing quarantines, controlling the interstate commerce of regulated articles, and directing and coordinating eradication efforts with state and federal agencies inside areas of quarantine. APHIS has 2,700 inspectors at 125 ports of entry around the country. The number of inspectors per state is determined by APHIS risk analysis factors such as volumes of cargo and passengers, and the potential for importation of known threats (see Table 2). Currently, there are 486 veterinarians in APHIS, serving in 45 Veterinary Services

(VS) area offices in the United States and its possessions. Close to 75% of these veterinarians (350) are certified as Foreign Animal Disease Diagnosticians.

Table 2. Top Five States Ranked by Number of APHIS Inspection Ports and Personnel

State	Number of Inspection Ports	Number of Inspectors
California	10	479
Florida	10	449
Texas	20	369
Hawaii	5	261
New York	5	242

APHIS is also the agency that monitors foreign animal and plant health, and it maintains an intensive surveillance system aimed at rapidly detecting and diagnosing outbreaks of exotic diseases in the United States. The staff is assisted in its efforts by other federal and state field veterinarians, animal and plant health technicians, and disease specialists. APHIS operates two foreign animal disease diagnostic laboratories in the United States: the Plum Island Animal Disease Center, Greenport, NY; and the National Animal Disease Diagnostic Laboratory in Ames, Iowa (APHIS operates the Ames lab jointly with ARS). Diagnosis for most OIE List "A" diseases are performed at Plum Island, which by nature of its isolation and its biosafety level-3 facility is suited to deal with these dangerous diseases. Plant pathogen and insect samples are handled at diagnostic facilities in Riverdale, Maryland. Diagnosis of these plant pests is done in collaboration with ARS taxonomists and with specialists at land-grant universities.

FSIS. USDA's Food Safety and Inspection Service plays an important role in detecting livestock disease within the borders of the United States. The agency is responsible for the mandatory inspection of meat, poultry, and processed egg products to ensure their safety, wholesomeness, and proper labeling. FSIS' Veterinary Medical Officer (VMOs) corps and inspectors conduct ante-mortem inspections on each animal slaughtered in the United States, keeping watch on unusual symptoms related to disease such as FMD or 'mad cow' disease. FSIS cooperates with APHIS in conducting disease surveillance. In the event of a suspicious symptom or disease, FSIS VMOs are instructed to notify APHIS. Of about 7,600 of FSIS' employees, roughly 1,120 of them are VMOs. FSIS inspects some 6,200 meat and poultry slaughter plants and import stations nationwide. The United States accepts meat and poultry imports only from foreign countries that FSIS has certified as having inspection systems at least equal to the U.S. system, and then only from plants on an approved list. FSIS personnel conduct some foreign plant reviews.

ARS. The Agricultural Research Service is USDA's in-house research agency. About 30% of ARS' $1 billion budget is dedicated to research in support of USDA's regulatory agencies. Among other things, ARS researches state-of-the art disease

diagnostic tools and animal vaccines. The service also works closely with other federal agencies, universities and private sector companies to develop these technologies though grants and Cooperative Research and Development Agreements (CRADA). Congress authorized CRADAs in the Federal Technology Transfer Act of 1986 (P.L. 99-502) to enhance the ability of federal research laboratories to work with industry to commercialize technology. This act and various other federal laws—including the Stevenson-Wydler Act of 1980 (P.L. 96-480) and the Bayh-Dole Act of 1980 (P.L. 96-517)—make the transfer of new technology to the private sector and industry a responsibility of all federal research agencies. Currently, there are nearly 230 active CRADAs, of which three are related to animal disease diagnostics or vaccines.

Federal Authorities. In the event of finding a foreign animal disease such as foot-and-mouth disease, whether accidentally or intentionally introduced, the Secretary of Agriculture has broad authority to eradicate it. The Secretary, for example may stop importation of animals and animal products from suspected countries (21 USC §§101 and 111), as Secretary Veneman did during the 2001 FMD outbreaks in the EU. Further, if an animal disease outbreak is found in the United States, the Secretary is authorized, among other things, to:

- Stop U.S. animal exports (21 USC §113), and interstate transport of diseased animals (21 USC §115);
- Impose quarantines on any state or territory (21 USC §123);
- Seize and dispose of infected livestock and prevent dissemination of the disease (21 USC §134a);
- Declare an extraordinary emergency on confirmation of a foreign animal disease diagnosis (21USC §134a);
- Compensate owners for the fair market value of animals destroyed by the Secretary's orders (21 USC §134a(d); and
- Transfer the necessary funding from USDA's Commodity Credit Corporation to cover costs of eradication and quarantine operations (7 USC §147b).[11]

The exact nature of control and eradication operations is difficult to predict. Past experience and simulations have shown that day-to-day decisions would be made using tools such as "decision trees" that include factors such as geographical spread, rates of infestation, available professional and field personnel, public sentiment, and industry cooperation. Similar authorities would cover attacks on crops (7 USC §§7701-7772).

Agroterrorism-related Obligations in USDA. According to the Congressional Budget Office (CBO), USDA receives little funding specifically earmarked for activities related to agroterrorism. In FY2001 for example, APHIS reported obligations of $150,000 to develop educational materials and training programs dealing with bioterrorism. For its part, ARS obligated $500,000 in FY 2001 to work on a system to improve on-site rapid detection of biological agents in animals, plants, and food and in cooperation with the Department of Defense and the

[11] The costs for a vaccination program, if one were ordered as an emergency measure during an FMD outbreak, would be additional.

Department of Health and Human Services.[12] In addition, APHIS, FSIS, and ARS conduct activities that enhance their capacity to protect against threats to agriculture similar to those posed by agroterrorism (e.g., protecting against accidental introduction of pests and diseases). According to a recent report from the Office of Management and Budget (OMB), USDA-ARS obligated $36.1 million in FY2000 for research on defenses against weapons of mass destruction and APHIS obligated $1.2 million on preparedness and response to a WMD attack. Differences in accounting of activities towards defense may account for the discrepancy in numbers between CBO and OMB reports.

The Federal Response Before and After September 11

USDA's Role in National Security. The terrorist attacks of September 11 have accelerated debates by national security analysts on ways to integrate USDA into homeland security protection schemes. Within USDA, however, this debate has been ongoing since 1988, when President Ronald Reagan issued Executive Order 12656 which required all federal agencies to develop preparedness planning for national security emergencies. Later, in 1998, Presidential Decision Directive (PDD) 62 gave USDA a seat at the table in the newly created Office of the National Coordinator for Security, Infrastructure Protection and Counter-Terrorism. USDA was also made a participant in the development of a Continuity of Operations Plan (COOP) for essential operations by PDD-67. This Clinton-era document required all federal agencies to develop plans to ensure the continuity of Constitutional Government in the event of an attack. More recently, in the aftermath of September 11, USDA has gained a seat on the National Security Council's Weapons of Mass Destruction Preparedness Group, and at the new Office of Homeland Security, which coordinates 46 federal agencies that share responsibility for protecting American citizens in case of attack.

Bioterrorism-related Appropriations in the Aftermath. In October 2001, President Bush proposed an allocation of $45.2 million to USDA as part of a $20 billion submission to Congress for emergency funding to strengthen essential programs and services related to terrorism. According to USDA, this funding would support:

- Enhanced security for facilities ($17.2 million);
- Design and construction of a satellite facility at USDA laboratory in Ames, Iowa for research activities ($14.1 million);
- Technical assistance to state, local, federal, and private sector entities to improve biosecurity ($5 million); and
- Education and training initiatives to strengthen response to potential food supply threats, improve data collection and dissemination, and other biosecurity activities ($8.9 million).

The President's proposal is being considered by Congress as part of the FY2002 Emergency Supplemental Appropriations (see "Legislation" section –H.R.3338). In

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[12] United States General Accounting Office. September 2001. Bioterrorism: Federal Research and Preparedness Activities. GAO-01-915.

addition, earlier this year USDA began an extensive program review, in light of the devastating outbreak of FMD in Europe; and APHIS received $5 million from the Supplemental Appropriations Act of 2001 (P.L. 107-20) to cover salaries and expenses incurred during the FMD scare. The administration requested $35 million for hiring additional border inspectors and veterinarians, for contingency planning, and for disease detection technology research. APHIS currently is increasing the inspection staff at U.S. ports of entry by 350 (for a total of about 3000 inspectors), and is adding 20 veterinarians to agricultural quarantine inspection programs. According to USDA, by the end of FY 2002, APHIS will have increased its inspection personnel at ports of entry by nearly 40%. APHIS also is stepping up smuggling interdiction activities and making $1.8 million in grants available to 32 states, specifically to help them plan their response to potential foreign animal disease outbreaks.

Issues and Options in Congress

While intelligence agencies have not discovered specific terrorist threats to agriculture to date, experts recognize weaknesses nonetheless and identify the following corrective actions:

Strengthening Security at Research Laboratories. The use of domestic airliners as weapons against the World Trade Center and the Pentagon has served as a chilling reminder of the cost-effectiveness of using the nation's resources against itself. Similar vulnerabilities may exist in U.S. agriculture's peacetime research infrastructure. Security analyses, such as those presented by the Gilmore Commission, have shown that security standards for protecting hazardous biological materials at the nation's public and private research laboratories vary widely from facility to facility. The situation may pose a potential opportunity for terrorists seeking to acquire lethal agents. Concerns stemming from the recent anthrax incidents have also heightened awareness about: (1) tightening pathogen inventory procedures, and (2) about restricting personnel access in some laboratories. While concerns revolve mainly around security at university and private laboratories, some are also calling for tighter security at USDA laboratories.

Currently, there are no consistent minimum safety protocols or security standards for animal research laboratories in the United States. To address this situation, some in Congress have proposed funding biosafety need assessment studies at states for laboratories under their jurisdiction. Others would like to see USDA taking the lead in developing minimum guidelines for laboratory safety and biosecurity. While support for these measures appears widespread, some in the research community are apprehensive about the cost of extensive regulations on laboratories beyond the expense of current laboratory safety procedures. According to USDA officials interviewed for this report, additional funding may also be required to help USDA to fulfill its obligations under PDD-67 (i.e., ensure continuity of operations under an attack to the nation), and to develop its liaison functions with the new Homeland Security Office.

Updating USDA Research Facilities. For years, groups such as the American Veterinary Medical Association, the United States Animal Health Association, and other organizations like the American Farm Bureau Federation have

argued for the need to fix and update deteriorating foreign animal disease research and diagnostic facilities at USDA.

USDA has acknowledged the poor state of repairs of these facilities, especially in Ames, Iowa, and also for the need to expand and upgrade facilities at Plum Island, NY. By law, Plum Island is the only place in the United States where, unless the Secretary determines otherwise, research on diseases such as FMD and rinderpest (and traditionally other "List A" diseases) is allowed (see 21 USC §135). Proposals in Congress would modernize and expand the current Biosafety Level 3 (BL-3) facility at Plum Island.

Another more controversial proposal for Plum Island calls for the construction of a Biosafety Level 4 facility. Such a facility would allow work with animal diseases that affect humans, such as the deadly Hendra and Nipah viruses. Biosafety Level 4, the highest safety classification, entails the most stringent safety precautions that requires researchers to wear protective suits when working in sealed laboratories. For years, similar proposals have met strong local opposition and a lack of support from members of the New York Congressional delegation. There are currently two BL-4 laboratories in the United States, one at the Centers for Disease Control and Prevention in Atlanta, GA, and another at the Army Medical Research Institute of Infectious Diseases at Fort Detrick in Frederick, MD. USDA officials have argued for the need of a BL-4 research facility to keep abreast of new and emerging disease threats, be that at Plum Island or at some other location within the United States. Conducting animal research at existing BL-4 facilities or at foreign locations has yet to be explored as an option.

There is also support in Congress for increased funding for the Southeast Poultry Disease Research Laboratory in Athens, GA, (research in Newcastle, avian influenza), and the Arthropod-borne Animal Diseases Research Laboratory in Laramie, Wyoming (research on bluetongue, vesicular stomatitis, plague, tularemia and West Nile virus). These USDA facilities would need refurbishing to expand research into emerging poultry or vector-borne diseases.

Supporting Research in Agricultural Biosecurity. In many ways, research that addresses prevention, detection and response to accidental introductions of diseases also helps in the event of an agroterrorist attack. Experts suggest that regulatory agencies, such as APHIS or FSIS, are in need of: (1) new technologies to help detect diseases at ports of entry; (2) rapid and inexpensive diagnostic tests that can quickly tell the difference between deadly pathogens or common diseases; (3) effective synthetic animal vaccines or disease-resistant plant varieties that could be used to suppress outbreaks or epidemics.

Recent scientific advances, especially in the private sector, have revolutionized disease epidemiology research with the development rapid diagnostic technologies (like ELISA or PCR)[13] with new synthetic vaccines, and with resistant biotech plant varieties. In fact, private research investment in the field of veterinary diagnostics,

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[13] *ELISA* = 'Enzyme-linked Immunosorbent Assay' (looks for pathogen-specific proteins); *PCR* = 'Polymerase Chain Reaction' (looks at pathogen-specific genetic material–DNA)

medicines, and biotechnology is at an all time high, and has surpassed public investment in agricultural research for over a decade. Still, economic and technical obstacles may make it difficult for U.S. private sector companies to enter into research and development of animal vaccines and diagnostics. For example, between 1990 and 2001, only 6 patents have been awarded for foot-and-mouth disease vaccines or diagnostic techniques worldwide. Of these, three are USDA patents, one from the government of Japan, and two belong to a small U.S. company in New York.

According to an official at the above-mentioned U.S. company, the decision to enter the market is risky and seldom profitable. Lack of tax or revenue incentives for developing products to satisfy relatively small markets (i.e., rare diseases), and the widely accepted policy of not vaccinating against FMD are seen as key obstacles.[14] Technical hurdles, such as those imposed by being unable to conduct efficacy testing for new diagnostics or vaccines at facilities other than at Plum Island are also cited. According to industry officials, cooperation between USDA and private sector companies to develop new products is minimal, and more cooperation would be welcome. According to USDA, there are three active CRADAs (out of 227) that deal with animal diagnostic/vaccine development between USDA and private sector entities (one is with a South African entity).

According to USDA, the Agricultural Research Service is currently conducting 86 animal health-related research projects ($88.9 million) in FY2001, including research on detection, diagnosis, and vaccines work in OIE 'List A' diseases like FMD. Other active research programs on animal diseases include projects on brucellosis, mad cow disease, bovine tuberculosis, chronic wasting disease, Johne's disease, porcine reproductive and respiratory syndrome virus (PRRSV), swine influenza virus (SIV), and porcine respiratory coronavirus, and poultry diseases such as HPAI, Newcastle and *Salmonella*.

Extramural research, which constitutes about 30% of USDA research portfolio, is coordinated by the Cooperative State Research, Education, and Extension Service (CSREES). CSREES is the agency within USDA that distributes annual federal appropriations to the states in partial support of their research, extension, and academic programs. In addition to formula funds to land grant colleges and other universities, CSREES administers research grant programs such as the National Research Initiative Competitive Grants Program (NRI) and the Special Grants program (almost exclusively earmarked grants to specific land grant institutions). In FY 2001, CSREES awarded 36 NRI grants for animal health projects ($6.4 million), and funded 7 animal health-related Special Grants ($3.8 million).

Improving Federal Inspection and Interagency Coordination. According to analysts, the new responsibilities of USDA within the Office of Homeland Security will require stronger coordination of its intra- and interdepartmental operations. Concerns about deficiencies in communication between USDA inspection agencies (APHIS and FSIS) were heightened by recent reports of

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[14] For more background information of FMD and the vaccine policy, CRS Report RS20890 (pdf) *Foot and mouth disease: a threat to U.S. agriculture*.

lax record-keeping and control procedures during the recent foot-and-mouth disease scare. The lack of adequate communication between agencies in USDA is not a new issue nor is it confined to this agency. Experts have proposed the creation of an integrated, automated record-keeping system to be used and shared across agencies. A similar system, the Operational and Administrative System for Import Support (OASIS), is used by the Food and Drug Administration (FDA) to link all inspection offices with the brokers at U.S. port of entry where FDA-regulated products come into the country. Based on the information supplied by the broker, OASIS is used to track imports and trigger inspection by FDA officials.

Another concern has been about increasing APHIS inspection capacity. While APHIS has in the past successfully kept out or intercepted many foreign pests and diseases, some question the agency's ability to respond to deliberate disease pest attacks. Specifically, the need for more border inspectors, and for more extensive use of modern detection technologies are among the key recommendations cited by critics. Following the FMD outbreaks in the EU, the agency has increased the number of inspectors but USDA and some industry sources would still like to see more personnel posted, but funding is an issue. As seen above, APHIS inspections are primarily funded through the collection of Agricultural Quarantine Inspection (AQI) user fees. The 1996 farm bill restricts APHIS from using all AQI fees it collects by making a significant portion of this source of funding subject to the appropriations process. Proponents of lifting this restriction, originally set to expire in 2002, argue that such a change would provide additional funding of close to $15 million per year for APHIS port-of-entry operations.

Finally, some proposals are currently being considered that would consolidate and revise the authorities of the Secretary of Agriculture relating to protection of animal health. These proposals would increase civil and criminal penalties for violations, reaffirm federal preemption of quarantine laws over state statutes, and modernize statutes to better conform to international trade agreements. Some experts and farm groups believe that provisions in these proposals would help APHIS fight agroterrorist threats, but have voiced disappointment that none of these provisions have been included in key agroterrorism bills moving in Congress. Repeated statements by APHIS Administrator Bobby Acord during congressional briefings seem to indicate that the Bush Administration is not seeking new authorities at this time, choosing instead to propose increased funding for activities under existing authorities.

Legislation

Several bills have been introduced in the 107th Congress that address some aspect of terrorism in agriculture, and they are summarized below. Some of these proposals address agroterrorism within the broader context of homeland defense measures, while others, such as the Senate-proposed Farm Bill (S.1731) address agroterrorism in the context of general agricultural legislation. As of December 19, 2001, half a dozen bills preponderantly address agroterrorism. A side-by-side comparison of key provisions of these bills is presented at the end of this report.

H.R. 3338 (Lewis). Department of Defense Appropriations Act, 2002 & Emergency Supplemental Act. The House-passed FY 2002 Supplemental Appropriations

(Division B) recommends an appropriation of $4.6 for emergency expenses related to September 11 at USDA's Office of the Secretary. The measure also recommends $2.9 million for buildings and facilities, The measure provides $5.6 and $8.2 million for salaries and expenses for ARS and APHIS, respectively; and $14.1 million for APHIS buildings and facilities. The Senate-passed bill recommends $80.9 million for emergency expenses for the Office of the Secretary. The measure also provides $70 million for salaries and expenses at ARS, and $95 million for APHIS, of which $50 million may be transferred and merged with the Agriculture Quarantine Inspection User Fee Account. The Senate engrossed bill also proposes $73 million for ARS buildings and facilities; and $14.1 million for APHIS. The latter appropriations will be used for facility upgrades at Ames, Iowa, Plum Island, N.Y., and others. In addition, the Senate bill offers $50 million for emergency expenses research and education for CSREES. Currently, the bill is in Conference.

H.R. 2795 (Nethercutt). Agroterrorism Prevention Act of 2001. Amends the federal criminal code to prohibit plant enterprise terrorism. Establishes and enhances penalties for animal and plant enterprise terrorism. Makes animal and plant enterprise terrorism a predicate offense under the Racketeer Influenced and Corrupt Organizations (RICO) Act. Authorizes appropriations of $5 million to the National Science Foundation (fiscal years 2002 and 2003) for animal and plant research security programs and grants. Introduced August 2, 2001; referred to the Subcommittee in Crime of the House Judiciary Committee.

H.R. 3174 (Pomeroy). Food Supply Protection Act. Authorizes appropriations to the Secretary of Agriculture for: (1) Department of Agriculture biosecurity initiatives required under Presidential Decision Directive PDD-67, to be used to secure resources and refurbish existing ARS and APHIS facilities; (2) research in support of bioterrorism response and research. Introduced October 25, 2001; referred to House Agriculture Committee, Subcommittees on Livestock and Horticulture, and on Conservation, Credit, Rural Development and Research.

H.R. 3198 (Putnam). Agricultural Terrorism Prevention Response Act of 2001. Directs the President to establish an Interagency Agricultural Terrorism Committee to coordinate the counter terrorism effort to protect the U.S. agricultural production and food supply system. Directs the Secretary of Agriculture to strengthen cooperation with other agencies; appoint an agricultural liaison to the Homeland Security Office; and establish an Industry Working Group on agricultural terrorism to develop counterterrorism measures. Establishes a Counterterrorism Policy Council to serve as the USDA senior policy forum regarding terrorism issues. Introduced October 31, 2001; referred to House Agriculture Committee, Subcommittee on Department Operations, Oversight, Nutrition and Forestry.

H.R. 3255 (Menendez). Bioterrorism Protection Act (BioPAct) of 2001. This is a broad anti-terrorism measure providing for improvements in public health infrastructure, for enhancements to law enforcement, and for the protection of agricultural production, food water supplies from terrorist attacks. Title II (Sec. 201)authorizes appropriations of $220,000,000 for activities to reduce threats from agricultural pathogens and insect pests, and for increased security of department information systems by establishing an 'automated record-keeping' and tracking system' that is fully integrated with the FSIS. Introduced November 8, 2001; referred

to the Committee on Energy and Commerce, and in addition to the Committees on the Judiciary, Transportation and Infrastructure, Armed Services, Science, Intelligence (Permanent Select), International Relations, Agriculture, and Ways and Means.

H.R.3293 (Lucas). Agricultural Bioterrorism Countermeasures Act of 2001. Authorizes appropriations for biosecurity upgrades at specified USDA and related facilities. Directs the Secretary of Agriculture, with respect to bioterrorism countermeasures, to: (1) expand ARS programs to protect the domestic food supply; (2) establish a Consortium for Countermeasures Against Agricultural Bioterrorism comprised of institutions of higher education in partnership with federal agencies; (3) enhance the National Research Initiative of the Competitive Grants Program to award grants research on bioterrorism protective measures; and (4) expand the capacities of the APHIS and FSIS. Introduced November 14, 2001; referred to House Agriculture Committee.

H.R.3310 (Ganske). Bioterrorism Preparedness Act of 2001. A bill to improve the ability of the United States to prepare for and respond to a biological threat or attack. Companion bill to S. 1765 (Frist). Section 512 enhances and expands capacity of the APHIS through the conduct of activities to protect against the introduction of plant and animal disease organisms by terrorists. Introduced November 16, 2001; referred to House Energy and Commerce, Subcommittee on Health, and House Judiciary and House Agriculture Committees.

S.1486 (Edwards). Biological and Chemical Weapons Preparedness Act of 2001. A broad based anti-terrorism bill that authorizes additional appropriations for programs concerning; (1) vaccine, antibiotic, and therapeutic research and development; (2) protecting the food supply (including interdiction); and (3) research by specified federal agencies and departments. Section 4(b) would strengthen the National Pharmaceutical Stockpile to include animal antibiotics and vaccines among other necessary materials. Introduced October 3, 2001; referred to Senate Health, Education, Labor and Pensions Committee.

S. 1546 (Roberts). Directs the Secretary of the Treasury to provide funding to the Secretary of Agriculture: (1) in FY2002 for specified bio-security initiatives, bio-safety animal research facilities, ARS/APHIS facilities, an animal disease laboratory, and agroterrorism rapid detection field test kits and training; and (2) in each of FY2002 through FY2011 for specified counter-bioterrorism research initiatives. Introduced October 15, 2001; referred to Committee on Agriculture, Nutrition, and Forestry.

S. 1548 (Carnahan). Bioterrorism Awareness Act. Requires the Director of the Centers for Disease Control and Prevention to award an initial 3-year grant to create and maintain an official federal bioterrorism information website. The website shall contain scientifically based information regarding how farmers and other personnel involved in the Nation's food supply system may protect themselves, their livestock, and the Nation's food supply in the case of a bioterrorist attack. Introduced October 15, 2001; referred to Senate Health, Education, Labor and Pensions Committee.

S. 1563 (Hutchison). Agricultural Bioterrorism Countermeasures Act of 2001. Establishes a coordinated program of science-based countermeasures to address the threats to agricultural resources. Directs the Secretary of Agriculture to: (1) expand

ARS programs to protect the domestic food supply; (2) establish a Consortium for Countermeasures Against Agricultural Bioterrorism comprised of institutions of higher education in partnership with federal agencies to develop long-term biosecurity programs; (3) enhance the National Research Initiative Competitive Grants Program by awarding grants for bioterrorism protective measures; and (4) expand the capacities of the APHIS and FSIS. Introduced October 17, 2001; referred to Committee on Agriculture, Nutrition, and Forestry.

S.1731 (Harkin). Agriculture, Conservation, and Rural Enhancement Act of 2001. Section 723 of the Research, Education and Extension title, would amend the National Agricultural Research, Extension, and Teaching Policy Act of 1977 (7 USC. §3101 et seq.) is amended by adding a "Biosecurity" subtitle. Provisions authorize appropriations of $100 million per year (FY 2003-2005) for agricultural research, education and extension activities in biosecurity planning and response activities, and for grants to modernize and build research facilities at eligible land grant universities or private sector institutions. Introduced December 14, 2001; considered by the Senate.

S.1764 (Lieberman). Robert Stevens, Thomas Morris Jr., Joseph Curseen, Kathy Nguyen, Ottilie Lundgren, and Lisa J. Raines Biological and Chemical Weapons Research Act. Provides federal tax incentives and credits to increase research by commercial, for-profit entities to develop vaccines, microbicides, diagnostic technologies, and other drugs to prevent and treat illnesses associated with a biological or chemical weapons attack. Establishes a Bioterrorism Countermeasure Purchase Fund for incentives to private sector research and development of countermeasures to respond to an attack with biological agents or toxins. Introduced December 4, 2001; referred to Senate Finance Committee.

S.1765 (Frist). Bioterrorism Preparedness Act of 2001. A bill to improve the ability of the United States to prepare for and respond to a biological threat or attack. Companion bill to S. H.R. 3310 (Ganske). Amends the Public Health Service Act to provide additional authorities of the Secretary of Health and Human Services, strengthens the Strategic National Pharmaceutical Stockpile and improves the ability of the Centers for Disease Control and Prevention to respond effectively to bioterrorism, among other things. Section 512 enhances and expands capacity of the Animal and Plant Health Inspection Service through the conduct of activities to protect against the introduction of plant and animal disease organisms by terrorists. Introduced December 4, 2001; The measure has been read the second time, and placed on Senate Legislative Calendar under General Orders. Calendar No. 255.

S.1775 (Hutchinson). Agroterrorism Prevention Act of 2001. Amends the federal criminal code to prohibit plant enterprise terrorism. Establishes and enhances penalties for animal and plant enterprise terrorism. Makes animal and plant enterprise terrorism a predicate offense under the Racketeer Influenced and Corrupt Organizations Act. Authorizes appropriations of $5 million to the National Science Foundation (fiscal years 2002 and 2003) for animal and plant research security programs and grants. Introduced December 5, 2001; referred to Senate Judiciary Committee.

Table 3. Side-by Side Comparison of Selected Bills on Agroterrorism

S.1546(Roberts)/ H.R.3174 (Pomeroy)	S.1765 (Frist)/ H.R.3310 (Ganske)	S.1563 (Hutchison)	H.R.3198 (Putnam)	H.R.3293 (Lucas)
Biosecurity Precautions and Standards				
H.R. 3174 authorizes $101.2 million (FY2002) appropriations, while S.1546 authorizes the same amount from unappropriated treasury funds. Funds are to be used by USDA for biosecurity initiatives required under Presidential Directive 67, and to expand security at existing facilities of in ARS and APHIS.	Authorizes $20 million in FY2002 and such funds as necessary in subsequent years for: (a) Land Grant University Assessments to establish 'minimum security standards' for facilities holding hazardous biological agents; (b) toward grants for land grant universities for biosecurity needs assessments; (c) developing a 'National Hazardous Agent Inventory' for agricultural research facilities; (d) Establish a national protocol for screening individuals who require access to agricultural research facilities in a manner that provides for the protection of personal privacy.	No Provisions	No Provisions	Authorizes appropriations for USDA/ARS for compliance of biosecurity responsibilities under PDD-67. (Amount not specified.)

S.1546(Roberts)/ H.R.3174 (Pomeroy)	S.1765 (Frist)/ H.R.3310 (Ganske)	S.1563 (Hutchison)	H.R.3198 (Putnam)	H.R.3293 (Lucas)
Facility Enhancements at USDA				
Authorizes in FY2002: from appropriations (HR 3174) or from unappropriated treasury funds (S.1546): $129 million for renovation research facilities, plus $105 million for a new Biosafety Level 4 facility at Plum Island Animal Disease Center, NY. $381 million to update of ARS and APHIS facilities in Ames, Iowa. $78.5 million for planning and design of an ARS facility in Athens, Ga. $29.8 million for renovation of the Laramie, Wyoming ARS facility.	H.R.3310 - For FY2002, authorizes $180 million for building upgrades, renovations in ARS/APHIS laboratories in Plum Island, and NY; Ames, IA; design of bio-containment laboratory for poultry research in Athens, GA; and renovation of Arthropod-Borne Animal Disease Laboratory in Laramie, WY. S. 1765- Same as Ganske's except that it specifies amounts for Plum Island ($100 million) and Ames ($80 million), and adds authority for funding in FY2003-2006 for the design of bio-containment laboratory for poultry in Athens, GA; and renovation of the Animal Disease Laboratory in Laramie, WY.	No Provisions	Calls for establishing a biosafety Level 4 facility at the Plum Island Animal Disease Center, (NY) for animal studies on human-animal pathogens (e.g., Nipah virus, Highly Pathogenic Avian Influenza (H5N1 strain), and Hendra virus.) (Authorization amount is not specified.)	Authorizes: $220 million for renovation of expansion of the Biosafety Level 3 facility at Plum Is. Animal Disease Center, N.Y. $385 million to update of ARS and APHIS facilities in Ames, Iowa. $106 million for planning and design of an ARS biocontainment lab poultry research in Athens, Ga. $9.0 million for renovation of the Animal Disease Laboratory in Laramie, Wyoming $20 million for expansion of the Biosensor Technologies Research Center at Oklahoma State University.

S.1546(Roberts)/ H.R.3174 (Pomeroy)	S.1765 (Frist)/ H.R.3310 (Ganske)	S.1563 (Hutchison)	H.R.3198 (Putnam)	H.R.3293 (Lucas)
Support for Research Authorizes, for each year (FY 2003-2011), $177 million for research in support of bioterrorism response initiatives. $57 million for joint research initiatives between ARS, universities and industry on bioterrorism. $25 million for competitive grants to universities and qualified research institutions for research on bioterrorism. (Total $2.3 billion between FY2003-2011)	Authorizes $20 million in FY2002, and such sums as necessary in subsequent years, for grants to land grant universities' biosecurity needs assessments (see Biosecurity and Standards in first section).	Authorizes $140 million for each of fiscal years 2003 through 2007 for expanding ARS research programs to respond and mitigate agroterrorism threats, and strengthen the capacity of USDA regulatory agencies (e.g., APHIS, FSIS); Authorizes $50 million for each of fiscal years 2003 through 2007 for creating a "Consortium for Countermeasures Against Agricultural Bioterrorism" to help form stable long-term programs of research, development, and evaluation of options to enhance the biosecurity of U.S. agriculture. Authorizes $30 million per year (FY2003-2007) for competitive research grants through the National Research Initiative program in CSREES for plant and animal disease research.	Calls for improving the capability to identify, treat and prevent swine diseases by creating diagnostic tests and vaccines needed to protect U.S. swine industry from acts of biological terrorism and diseases, such as the Nipah virus. (Authorization amount is not specified).	Similar to S.1563 except that, in addition, the bill authorizes $120 million for collaborative research with the Oklahoma City National Memorial Institute for the Prevention of Terrorism, the Department of Justice, and other law enforcement organizations.

S.1546(Roberts)/ H.R.3174 (Pomeroy)	S.1765 (Frist)/ H.R.3310 (Ganske)	S.1563 (Hutchison)	H.R.3198 (Putnam)	H.R.3293 (Lucas)
Interagency Coordination and USDA Response				
Authorizes $10 million appropriations in FY2002, for training and for purchase of rapid detection field test kits to be distributed by USDA to State and local agencies engaged in defending against agroterrorism	Authorizes $30 million appropriations in FY2002 for: (a) Establishing cooperative agreements for preparedness between APHIS and states regulatory agencies; and private veterinarians. (b) Developing a 'high-tech agriculture early warning and emergency response system'; (c) Implementing an 'Automated Record Keeping System' integrated with FSIS.	Authorizes $140 million per year (FY2003-2007) for : (a) to enhance and expand APHIS' inspection capacity at international points of origin, at ports of entry and customs; and (b) to adopt new strategies and technologies for dealing with outbreaks of plant and animal disease arising from acts of terrorism., Authorizes $140 million per year (FY2003-2007) to enhance and expand FSIS' meat and poultry inspection capacity, rapid detection, and adopt new ante-mortem and post-mortem inspection techniques.	Calls for the appointment liaison official between USDA's Counter terrorism Policy Council and the Homeland Security Office. Calls for an Interagency Agricultural Terrorism Committee to coordinate the counter terrorism efforts in agriculture. Committee agencies would be USDA, FDA and state departments of agriculture. (Authorization amount is not specified.).	Same as S. 1563 except that, in addition, the bill authorizes $10 million for the purchase of rapid detection field test kits to be distributed by USDA to state and local agencies engaged in defending against agroterrorism, including training.

S.1546(Roberts)/ H.R.3174 (Pomeroy)	S.1765 (Frist)/ H.R.3310 (Ganske)	S.1563 (Hutchison)	H.R.3198 (Putnam)	H.R.3293 (Lucas)
Education and Technology Transfer No Provisions	USDA shall develop and implement an 'Industry-on-Farm Education' program to provide biosecurity education for farms, livestock confinement operations, and livestock auctions; The Secretary shall develop and implement educational programs on animal quarantine and disease testing guidelines for farmers and producers;	No Provisions	Establishes a consultative "Industry Working Group" on Agricultural Terrorism Establishes special training and information programs for agricultural producers on counter terrorism measures. Establishes a database to link animal and human disease information systems.	No Provisions