

A history of biological disasters of animal origin in North America

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Summary

This paper examines past occurrences in North America relevant to the possibility of biological disasters with animal origins. With respect to naturally occurring animal disease outbreaks, North America, while not as adversely affected by epizootics as other regions, has had its fair share of such outbreaks of both 'traditional' and emerging animal diseases. The traditional category includes such diseases as anthrax, classical swine fever, bluetongue, brucellosis, foot and mouth disease, and the family of equine encephalomyelitis viruses. The emerging diseases include relatively more recent culprits such as postweaning multisystemic wasting syndrome, poultry enteritis mortality syndrome, and newly discovered examples of the transmissible spongiform encephalopathies. Additionally, several serious diseases of human beings that involve animal vectors or reservoirs occur naturally in North America or have emerged in recent decades; these include plague, hantavirus, monkeypox, West Nile virus and avian-derived influenza. At the same time, there have been very few intentional attacks on livestock using biological agents and no recorded cases in North America of animals intentionally being used to transmit disease to humans. According to the historical record, therefore, naturally occurring emerging zoonoses probably constitute the greatest threat in terms of biological disasters with animal origins. However, some of the general trends in terrorist activity, such as the intensification of activities by animal rights extremists against facilities undertaking animal research, mean that the possibility of intentional animal-related biological disasters should not be discounted.

Keywords

Biological disaster/attack – Bioterrorism – Epidemic – Epizootic – Livestock – Outbreak – North America – Terrorism – Zoonosis.

Introduction

During the past decade, and especially since the terrorist attacks of 11 September 2001, there has been a surge of speculation and angst about the possibilities of a bioterrorist attack on the territories of the United States of America (USA). This has included increasing public awareness of the possibility that such an attack may target or utilise North America's indigenous or imported fauna. There is also, of course, the perennial danger of naturally occurring epizootics wreaking havoc on the livestock industry and thus inflicting significant harm on the

regional economy. While the historical record is hardly an infallible predictor of what, if any, hazards lie ahead in terms of biological disasters with animal origins, we should not ignore Confucius' admonition to study the past if we would define the future. This paper will therefore examine past occurrences in North America that are relevant to the possibility of biological disasters with animal origins.

The authors will describe four different types of events that are pertinent to the topic. The paper begins with a survey of some of the more important outbreaks that have occurred naturally among animals in North America. This

will be followed by a brief discussion of human epidemics in North America in which animals are known or suspected to have acted as either vectors or the source of the epidemic. These first two event types will not be dealt with comprehensively; only some of what the authors believe to be the more salient cases will be mentioned. This is partly owing to limitations of space, but a more significant reason is that despite repeated attempts to produce a comprehensive listing of such incidents from 1900 to the present, including queries to relevant government agencies, the authors were unable to confirm the existence of any systematic record of such events. If indeed there are no broad chronologies of these types of events, this suggests a need to develop a historical database that could be mined for analytical insights into the origin and course of biological disasters involving animals.

The last two sets of data to be discussed concern intentional biological attacks, beginning with biological attacks against animals in North America and concluding with biological attacks against humans that utilised animal life as vectors or zoonotic reservoirs. These latter sets of data are drawn from databases maintained by the Weapons of Mass Destruction Terrorism Research Program at the Monterey Institute of International Studies, which records information on all intentional incidents involving non-state actors and chemical, biological, radiological and nuclear weapons. The paper will conclude with some remarks concerning the extent to which the historical record can be used to forecast possible future threats.

Naturally occurring epizootics among animals in North America

North America, while not as adversely affected by epizootics as regions such as South-East Asia or parts of Africa, has had its fair share of naturally occurring outbreaks and near-disasters. The sources of these events can be broadly divided into two main categories: well-known, 'traditional' animal diseases, and those that in the North American context are emerging diseases of animals. While these categories are not clearly defined (an emerging disease of today could be regarded as endemic within a few decades), the former category includes such diseases as anthrax, classical swine fever (CSF) – also known as hog cholera – bluetongue, brucellosis, foot and mouth disease (FMD), and the family of equine encephalomyelitis viruses. The emerging category includes relatively more recent disease culprits such as postweaning multisystemic wasting syndrome (PMWS), poultry enteritis mortality syndrome (PEMS), and newly discovered examples of the transmissible spongiform encephalopathies. The etiologic

agents of some of these more recently recorded diseases are still not fully understood. Furthermore, there are also certain zoonotic pathogens that have sub-clinical effects on animals but pose an emerging health hazard to human beings, including *Escherichia coli* O157:H7, hantavirus, newly discovered species of *Ehrlichia* that cause human granulocytic and monocytic ehrlichiosis, and the monkeypox virus. Although the authors' list of naturally occurring animal disease outbreaks is far from comprehensive, certain significant diseases and outbreaks will be discussed below in order to illustrate past experience and mitigating efforts undertaken in North America.

When looking at animal pathogens historically present in North America, anthrax (as well as being a highly feared biological weapon) has long been regarded as a serious disease of livestock (and humans), and there have been periodic outbreaks in North America. For example, Canada experienced eight sporadic outbreaks of anthrax among bison herds between 1962 and 1991, which collectively led to the deaths of over a thousand animals (18). In the past five years, anthrax outbreaks in the USA have led to several hundred livestock deaths, primarily in North and South Dakota, Texas and Minnesota. In May 2000, anthrax was detected on a North Dakota farm, which led to the quarantining and vaccination of 132 farms and resulted in 157 livestock fatalities on 31 farms by September that year. In 2001, an outbreak erupted in south-west Texas that affected 63 farms, infecting 1,638 animals of 11 different species (3).

While anthrax outbreaks can be largely controlled by a prompt disposal of infected carcasses, the highly contagious FMD can involve quarantine and mass destruction of exposed livestock. In addition, FMD has been identified as a serious bioterrorist threat because animal infection is easily accomplished and such an attack would cripple a crucial part of the agriculture sector in North America (8). During the 1920s, FMD outbreaks in the USA resulted in the loss of more than 120,000 livestock and deer. Fortunately, there has been no outbreak in the USA since 1929, when Southern California was affected (9), and the last major outbreaks of FMD in Mexico and Canada occurred in the 1950s. Nevertheless, the possible reappearance of FMD in North America poses a constant threat to the livestock sector, especially in the USA where vaccines are not routinely used and farms operate in a highly concentrated manner, which would make the raw economic loss potentially devastating.

Various species of brucella bacteria, including *B. suis*, *B. abortus* and *B. melitensis* have been endemic causes of brucellosis among livestock in the USA, although the rates of both human and animal occurrences have decreased to relatively negligible levels in the past half-century. The recent discovery of brucellosis in bison herds in

Yellowstone and Grand Teton National Parks has, however, raised fears of a potential rise in the incidence of the disease among livestock in surrounding states (17).

A disease of wild ruminants that has been responsible for several deer epizootics in the USA and southern Canada is epizootic haemorrhagic disease (21). In the pig industry, one of the most economically devastating diseases has traditionally been CSF. By 1978, CSF was eradicated in the USA as well as Canada, but still exists in parts of Mexico (15). Another set of pathogens endemic in the Americas is the equine encephalomyelitis family of viruses, which are spread by mosquito vectors and cause three significant diseases: eastern, western and Venezuelan equine encephalomyelitis. Although a relatively rare cause of disease in the human population, these viruses have triggered several epizootics in North America in the past century. For example, during 1937 and 1938, more than 300,000 equines in the USA and Canada were infected with western equine encephalomyelitis, and a series of epizootics of Venezuelan equine encephalomyelitis occurred in Central America, Mexico and Texas between 1969 and 1971 (6). Eastern equine encephalomyelitis continues to be a constant threat in many states, especially in the south.

Recently, several emerging diseases of animals have appeared in North America in almost every sector of animal agriculture. Fortunately, none have yet resulted in large losses to the agricultural sector. With certain pathogens, however, their very appearance has been a cause for concern. Two poorly understood syndromes affecting swine herds have been observed in the USA within the last decade: several small outbreaks of PMWS have been reported, and the first two documented cases of porcine dermatitis and nephropathy syndrome occurred in Michigan in 1997 (30). The commercial poultry industry has had to contend with PEMS since 1991. Exotic Newcastle disease, a serious disease of birds, has also struck the USA several times in the past few decades. An outbreak in southern California from 1971 to 1973 caused severe disruption and resulted in the extermination of 12 million commercial poultry birds, and the loss of US\$ 56 million in direct costs to the industry and increased poultry prices (29). More recently, an outbreak in southern California and Nevada from 2002 to 2003 led to the elimination of over 2 million birds (28).

The reappearance in Yellowstone National Park, Michigan and Texas, of *Mycobacterium bovis*, a less common cause of tuberculosis, has raised concern that the disease might spread to commercial cattle herds (16).

One class of diseases that has drawn extensive attention in recent years is the transmissible spongiform encephalopathies, which are caused by proteinacious particles known as prions. Although scrapie has been

observed in sheep for a long time, the appearance of similar diseases in other animals (including bovine spongiform encephalopathy [BSE] in cattle and chronic wasting disease [CWD] in deer) became front-page news around the world when it was shown that these diseases are zoonotic and transmissible to humans through ingested animal material, resulting in a fatal disease labelled variant Creutzfeldt-Jakob disease. There have only been two positive BSE cases in the USA and three in Canada, while CWD has been recorded in the Canadian province of Saskatchewan and in the western USA. Despite the small number of cases, the discovery of BSE in cattle in the USA has the potential to cause severe disruption to the industry due to export bans, productivity losses in small farming communities and decreases in domestic and foreign consumer confidence. And if there were found to be a transmissible spongiform encephalopathy specific to North America, this would not be unexpected; the discoverer of transmissible mink encephalopathy, the late Richard Marsh, claimed that the farmer whose mink were affected had fed the animals only on fallen cattle (20).

Naturally occurring zoonoses in North America

Several serious diseases of human beings that involve animal vectors or reservoirs occur naturally in North America. Among the most virulent of these is plague. Plague is a bacterial infection caused by *Yersinia pestis*, which is transmitted by the rodent flea and has the capacity to develop into three forms: bubonic, septicaemic and pneumonic. The disease is endemic in the rodent population in many parts of North America and sporadically crosses over to the human population. At present most cases of human plague are mild and endemic in the western and south-western regions of the USA, where 10 to 15 human cases of plague are reported each year (13). From 1924 to 1925, Los Angeles experienced a rat-borne epidemic, and in 1965 seven cases were reported from the Navajo Reservation in McKinley County, New Mexico. Thereafter, the average annual number of human plague cases has increased (5), with approximately 400 human cases of plague reported to the Centers for Disease Control and Prevention (CDC). In addition, a few cases have emerged from south-western Canada and parts of Mexico. In Canada, south-eastern Alberta and south-west Saskatchewan display ongoing plague activity in animals, but no human cases have been reported.

One of the zoonotic diseases most feared by infectious disease specialists is influenza. Influenza pandemics can emerge rapidly and the virus manifests an ability to produce strains to which the human population has no immunity, on occasion causing widespread upheaval due

to the virus's high contagion and virulence factors. The 1918 Spanish flu, H1N1, continues to hold the title for the most devastating flu pandemic to date. Infecting more than 200 million people worldwide, H1N1 spread to the USA and within 18 months caused more than 500,000 deaths (14). Subsequent pandemics, which were not nearly as devastating, include: the 1957 Asian flu, H2N2 (probably caused by the interaction of an animal with human H1N1 and avian H2N2 strains), which caused 70,000 USA fatalities, and the 1968 Hong Kong flu, H3N2, which led to 34,000 USA fatalities (14).

The recent appearance of a highly pathogenic avian influenza (AI) virus (H5N1), the so-called 'bird flu', has led many scientists to express concern that this might signal another major flu pandemic. Before 1997 this virus was known to infect only birds, yet it subsequently made a leap to infecting humans, suggesting that mutation could result in a strain capable of human-to-human transmission (34). While domestic flocks, and more recently pigs, are the most common vectors, cats are also thought to be possible infection vectors for H5N1, which spreads in the air, manure and, more recently, through contaminated feed, water, equipment and clothing (1).

No cases of human or animal infection with the current strain have been reported in North America, but the continent has had several brushes with similar organisms in the past. In 1924 and 1929, a low-pathogenic AI was recognised in the USA and quickly eradicated. Scientists soon discovered, however, that H5N2 and H7N1 could mutate while circulating within infected pig or poultry populations and develop a high pathogenicity if not treated immediately. Tentative reactions by farm owners and agricultural producers who fail to respond aggressively to such outbreaks can have devastating consequences. This was the case in 1983, when H5N2 infected Pennsylvania poultry farms with a low-pathogenic influenza that within six to nine months evolved into a highly pathogenic form. The outbreak devastated flocks and caused the extermination of 17 million birds in an eradication effort that took more than two years, causing the loss of US\$ 65 million in direct costs and US\$ 200 million in indirect costs (33). In 1992, a similar outbreak occurred in poultry flocks in Mexico, where a low-pathogenic H5N2 influenza quickly evolved into a lethal form. A poor response and failure to institute proper containment measures meant that the disease was not controlled until 1995, when the virus reverted to a low-pathogenic form (33). The government administered more than 2 billion doses of vaccines. More recently, a H7N2 outbreak in Virginia's Shenandoah Valley infected one person, affected 197 poultry farms and caused the killing of nearly 5 million birds (23). Following this was an outbreak in 2004 of H7N3 influenza in poultry farms in the Fraser Valley region of British Columbia. In March 2004, two laboratory-cases of human infection were confirmed,

alongside ten other cases involving infected Fraser Valley poultry workers (10). All infected persons were treated, the area was quarantined, and by August the Canadian Food Inspection Agency had destroyed 17 million birds in the Fraser Valley and thus eliminated the virus (10).

There are also several zoonoses that have emerged in North America that, while not necessarily affecting animal agriculture in any significant fashion, might pose a public health threat. Stephen Ostroff of the CDC declared that 'There's no way that West Nile is going to go away', following the startling discovery in 1999 of the mosquito-borne West Nile virus (WNV) in a dead crow at the New York City Bronx Zoo (4). The discovery of WNV signalled the introduction of a completely new virus to North American public health officials, and led to the hospitalisation of 59 New York residents who developed symptoms including flaccid paralysis (4). Known as 'NY99', this outbreak caused seven fatalities.

While most people infected with WNV show few if any symptoms, the remaining 20% of patients can experience flu-like symptoms and inflammation of brain tissue that leads to partial paralysis (encephalitis) and/or serious swelling of the tissue that encloses the brain and spinal cord (meningitis). By 2002, reports from both Texas and Mexico revealed that WNV had infected nearly 700 horses and 30 birds in Coahuila, Tamaulipas, Chihuahua and other areas. There were no reports of human infection in Mexico, leading public health officials to wonder whether the Mexican population maintains some type of immunity due to prior exposure to four strains of dengue virus, a member of the same family of flaviviruses (24). By 2003, seven Canadian provinces (Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and Alberta) had also been affected (26). While rates of human infection have continued to decrease, 60 mosquito species have been identified as potential vectors for a virus that in the course of its North American tour has affected 200 species of birds, reptiles, and mammals (32), leaving public health officials shocked by the uncharacteristic mobility of the virus, for which they were unprepared. At the time of writing, there is no vaccine available for humans.

Monkeypox, a relative of smallpox, camelpox and cowpox, is a virus endemic to the African rainforest that made its surprising North American debut in several states of the USA's Midwest in 2003. Public health officials believe animal-to-human transmission occurred through prairie dogs that made contact with infected rodents that had been imported from West Africa. Over 70 cases of human infection were reported to the CDC, all characteristically involving human contact with infected prairie dogs (11). The smallpox vaccine was used to contain the outbreak and dispel public fear, while multiple bans were placed on the importation of African rodents and the distribution, sale and transport of prairie dogs, tree squirrels, rope

squirrels, dormice, Gambian giant rats, brushed-tailed porcupines and striped mice. Although they have not yet reached North America, the nipah and hendra viruses are further examples of two diseases found in fruit bats that are potentially lethal and possess the ability to move across borders in the same way that monkeypox did.

Escherichia coli O157:H7 and *Salmonella* Typhimurium DT104 are two organisms that have caused serious illness in North American human populations in the past decade. The primary sources are infected cattle and their faeces, despite the fact that *E. coli* O157:H7 rarely results in overt symptoms in cattle. In 1999 nearly 1,000 illnesses and two deaths attributed to *E. coli* were reported in upstate New York, after attendees of a county fair consumed water that was contaminated with manure runoff from infected cattle (7). Ontario, Canada, has experienced two major *E. coli* O157 outbreaks in the last five years. The first, and more severe of these, occurred in May 2000 when 2,500 people were infected with *E. coli* O157 after water supplies became contaminated, causing seven fatalities. In the second outbreak, in 2005, four people were infected after a vendor distributed milk infected with the H7 strain (22, Case # 1833).

Since the first appearance of hantavirus pulmonary syndrome (HPS) in May 1993 in the south-western USA, 396 cases have been reported, with 36% resulting in death (12). The syndrome is caused by the hantavirus and transmitted through rodents. In Canada from 1989 to 1999, 32 confirmed cases of HPS, with a fatality rate of 38%, were reported (25). There have been no reports of human-to-human transmission, but the CDC in the USA has classified hantavirus as a Category C agent, an emerging pathogen that could be engineered for mass dissemination in the future because of its availability and ease of production.

Intentional biological attacks on livestock in North America

According to the historical record, there have been very few intentional attacks on livestock using biological agents. The most prominent case occurred during the First World War, when Germany developed a covert programme of bioagricultural warfare with the help of American-born Anton Dilger. Dilger obtained cultures of anthrax and glanders in Berlin and smuggled them into the USA, where he grew them in a laboratory in Baltimore. He used the pathogens to contaminate needles and infect horses and mules in the USA that had been drafted for the armies of

European allies of the USA. Following initial contamination the virus reportedly spread naturally and led to an estimated 3,000 infected horses and significant costs (2). Such claims, however, must be treated with caution. Given the state of veterinary medicine at the time, it is possible that at least some of the infections attributed to human sabotage might merely have been the result of natural disease outbreaks among stressed animals kept in crowded conditions.

The only other relevant case occurred in 1997 in Berlin, Wisconsin, where Brian W. 'Skip' Lea dumped pesticides onto deadstock (rendered-down animal products) of the National By-Products (NBP) company, which had been sold as animal feed to other businesses. An anonymous letter informed NBP that its supply had been contaminated, forcing the company to shut down its Wisconsin plant and engage in a massive recall at a cost of US\$ 2.5 million (27, 31). Granting that pesticides are chemical agents, the use of biological materials (deadstock) to disseminate the pesticides arguably places this incident in the biological category as well. Lea was indicted and charged as the saboteur in September 1999.

Intentional attacks on humans by means of zoonotic diseases using animals as vectors in North America

There have been no recorded cases in North America of animals intentionally being used to transmit disease to humans. There are however two instances of this activity forming part of the thinking of perpetrators. Between 1975 and 1977, Artis O'Dell and Leon Horton sent several threatening letters containing ticks allegedly infected with deadly diseases as part of an extortion campaign. Most of the time, the ticks did not survive passage through mail-cancelling machines. O'Dell and Horton were arrested in May 1981 and later convicted of conspiracy to obstruct commerce by means of extortion (22, Case # 407). The second instance occurred in September 1978, when Mayor Lewis Murphy of Tucson, Arizona, received an undisclosed number of letters threatening that unless a US\$ 500,000 ransom was paid, the poor were given food, and the Kino Community Hospital resumed performing abortions, the perpetrator would contaminate the city with bubonic plague-carrying fleas. The perpetrator did not arrive to collect the money when police delivered it (22, Case # 401).

General trends in chemical and biological attacks

According to the CDC, four of the six deadliest biological agents are zoonoses: *B. anthracis*, *Y. pestis*, *Francisella tularensis*, and filoviruses/arenaviruses (1). However, the record of intentional biological attacks involving animals is exceedingly sparse, with the vast majority of agriculturally related attacks involving chemical agents or crops as a target. For example, it is alleged that in 1970 the Ku Klux Klan used cyanide to poison the water supply of a 1,000-acre farm owned and operated by a group of Black Muslims, killing 30 cows (22, Case # 447). In fact, the overall record of intentional chemical attacks is much greater than that of biological attacks. There have only ever been 41 confirmed uses of biological agents as weapons by non-state actors, while the figure for chemical agents is 225. The corresponding casualty figures are even more telling – with 6,659 non-fatal injuries and 1,652 fatalities within the last century from the non-state use of chemical agents, compared with 1,079 non-fatal injuries and only 21 fatalities from corresponding biological attacks (22). These figures may give some indication of what to expect if those using chemical and biological weapons were to change their tactics and target animals.

Animal rights and environmental extremism

The past decade has seen a rapid increase in both the number and scale of attacks by animal rights and environmental extremists. The Federal Bureau of Investigation in the USA estimates that one group alone, the Animal Liberation Front (ALF), has committed over 700 criminal acts and caused US\$ 112 million in damage in the past decade (19). The ALF and another group opposed to animal experimentation and vivisection, Stop Huntingdon Animal Cruelty, have launched many of their attacks on facilities that work with both animals and animal and human pathogens. While the primary purpose of these so-called 'direct actions' is usually to release experimental animals, disrupt research and/or intimidate scientists, there is the possibility that such an attack could result in the accidental release of an animal or zoonotic pathogen into the environment.

Conclusion

The above description of North America's colourful history of epizootics and zoonoses reveals a wide variety of pathogens that have found their way through or to animals on the North American landmass. North American agriculture has had to contend with many of the maladies that afflict livestock throughout the world, in addition to several diseases found only in this region. Moreover, transnational flows of goods, people and other vectors mean that this region is increasingly being exposed to emerging natural diseases of animals, some of which may have dire consequences for the region's livestock industries.

Conventional ideas regarding bioterrorism regard humans as the primary target. At present, fortunately, the main threat to livestock does indeed seem to be naturally occurring outbreaks, especially those involving emerging (foreign) animal diseases, rather than intentional biological attacks. Yet circumstances may change. The agricultural industry is vulnerable both economically and politically. These weaknesses, coupled with the relative ease of procuring and disseminating animal pathogens, present an attractive option for intentional attacks on livestock in North America. Natural outbreaks of diseases can, however, serve an illustrative function in highlighting the mass disruption and devastation that could arise from a well-planned intentional release.

Naturally occurring emerging zoonoses probably constitute the greatest threat related to biological disasters with animal origins. The human immunodeficiency virus, severe acute respiratory syndrome, monkeypox, Nipah virus, AI and WNV are all examples of emerging infectious diseases that have jumped from animal reservoirs into the human population while exercising their ability to spread rapidly. Urbanised centres are expanding and encroaching on natural animal habitats, international travel is increasing, and trade in exotic animals and agriculture is becoming globalised; consequently containment is difficult, the rate of infection is rapid, and hosts outside the regional locus of infection are all but immune. If the history of animal disease in North America teaches us anything, therefore, it is that we must maintain constant vigilance towards emerging biological threats, not only for the sake of the economic health of our livestock industries, but also for public health in general. ■

Aperçu historique des catastrophes biologiques d'origine animale en Amérique du Nord

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Résumé

Le présent article passe en revue l'histoire des événements en Amérique du Nord en rapport avec la possibilité de catastrophes biologiques d'origine animale. En ce qui concerne les foyers de maladie animale naturelle, ce continent, bien que moins touché par les effets négatifs des épizooties que d'autres régions, a enregistré bon nombre de foyers épizootiques de maladies animales tant « classiques » qu'émergentes. Parmi les maladies traditionnelles figurent la fièvre charbonneuse, la peste porcine classique, la fièvre catarrhale du mouton, la fièvre aphteuse et la famille des encéphalomyélites équine. Les maladies émergentes regroupent des pathologies relativement plus récentes telles que le syndrome cachectique multisystémique du post-sevrage et certaines encéphalopathies spongiformes transmissibles découvertes récemment. En outre, plusieurs maladies humaines graves dans lesquelles interviennent des vecteurs ou des réservoirs animaux se déclarent naturellement en Amérique du Nord, ou sont apparues ces dernières décennies ; il s'agit notamment de la peste, des infections à hantavirus, de la variole du singe, de la fièvre West Nile et de la grippe d'origine aviaire. En revanche, on a constaté très peu d'utilisations à des fins malveillantes d'agents biologiques contre le bétail et on n'a signalé aucun cas, en Amérique du Nord, d'animaux utilisés dans l'intention de transmettre une maladie aux humains. Ainsi, selon les archives, les zoonoses émergentes survenant naturellement constituent probablement la menace la plus grave de catastrophe biologique d'origine animale. Cela étant, compte tenu de certaines tendances générales en matière d'activités terroristes, telles que l'intensification des actions des extrémistes défenseurs des droits des animaux dirigées contre les centres de recherche pratiquant des expériences sur les animaux, la possibilité d'une catastrophe biologique d'origine intentionnelle en rapport avec les animaux ne doit pas être écartée.

Mots clés

Amérique du Nord – Attaque/catastrophe biologique – Bétail – Bioterrorisme – Épidémie – Épizootie – Foyer – Terrorisme – Zoonose.



Historia de los desastres biológicos de origen animal en Norteamérica

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Resumen

Los autores examinan diversos episodios que han tenido lugar en Norteamérica relacionados con la posibilidad de desastres biológicos de origen animal. Por lo que respecta a brotes zoonosarios por causas naturales, esa región, aunque menos afectada que otras por las epizootias, no ha dejado de sufrir un buen

número de brotes de enfermedades animales, tanto “tradicionales” como emergentes. Entre las primeras figuran por ejemplo el carbunco bacteridiano, la peste porcina clásica, la lengua azul, la brucelosis, la fiebre aftosa o las virosis de la familia de la encefalomiелitis equina. Entre las enfermedades emergentes hay dolencias relativamente nuevas como el síndrome multisistémico de desmedro post-destete o el de mortalidad de pavipollos por enteritis, o ejemplos recientemente descubiertos de encefalopatías espongiiformes transmisibles. En Norteamérica, además, se dan de forma natural o han aparecido en los últimos decenios una serie de graves enfermedades humanas en las que intervienen vectores o reservorios animales: peste, hantaviriosis, viruela símica, fiebre West Nile o gripes derivadas de la influenza aviar. Al mismo tiempo, en Norteamérica ha habido muy pocos ataques intencionados contra el ganado con agentes biológicos, y no se ha registrado ningún caso de utilización deliberada de animales para transmitir enfermedades a las personas. A juzgar por la historia, en consecuencia, la mayor amenaza por lo que respecta a los desastres biológicos de origen animal radica probablemente en las zoonosis emergentes inducidas por causas naturales. Sin embargo, dentro de las características generales de la actividad terrorista se observan ciertas tendencias, como la intensificación de los actos contra instalaciones de investigación animal por parte de extremistas que enarbolan los derechos de los animales, que impiden descartar la posibilidad de que se produzcan desastres biológicos de origen intencionado vinculados al mundo animal.

Palabras clave

Bioterrorismo – Bovino – Brote – Desastre/ataque biológico – Epidemia – Epizootia – Norteamérica – Terrorismo – Zoonosis.



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