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Threat of the biological weapons

Abstract

The biological weapons often is defined as “weapons of mass destruction poor”, because this is relatively cheap and easy in the production, hidden and relocation. The risk of the use biological weapons still seems to be very real. A possibility of using weapons of mass destruction (biological weapon) is arousing special danger by contemporary terrorist organizations. In this article in a synthetic, based on the available references and the unpublished information, author present the current level of threat of biological terrorism.

Keywords: *security, threats, bioterrorism, biological weapon, weapons of mass destruction*

Introduction

It still remains a challenge to provide security for people and their surroundings in case a threat of weapons of mass destruction emerges. As rightly pointed out by Krzysztof Liedel and Paulina Piasecka (2008, p. 10), “It is a threat that should be taken into account by each of contemporary countries based on the western model of governance”. In this respect biological weapons seem to be particularly dangerous owing to their low costs of production and the information revolution, which facilitates access to scientific information and at the same time it enables to create this type of weapons practically at home.

Biological weapons are nothing more than the use of pathogenic micro-organisms (viruses, rickettsiae, bacteria and toxins, pathogenic fungi, protozoa produced by them) in order to attack people, animals and infect water, plants, crops and food products, whose purpose is to cause an epidemic and infectious diseases of people and animals, which are difficult to cure (*Leksykon wiedzy wojskowej* 1979, p. 52). A wide range of micro-organisms and toxins may lead to palsy of the population from incapacitating to fatal, as well as it can cause contamination of the environment that may last from few hours to few weeks or even years. The abovementioned information allows for an inference that the use of biological weapons must be perceived as a strong bargaining counter (Tylak 2012, p. 8).

History has noted numerous instances when infectious diseases decimated humanity. Since the dawn of time they have been employed while fighting, and as the time passed deliberate proliferation of diseases has become one of the greatest threats to human health and life as well as to the natural environment. Infectious diseases have a detrimental influence also in contemporary times – annually approximately 17 million people (50000 people a day)¹ die due to “invisible killers”. A certain paradox may be noticed, namely when a plethora of doctors and researchers wholeheartedly face a battle with pathogens in view of rescuing human life, others with equal zeal improve ways to do harm to human life. The vision of using pathogens and steering them so as to bring about a pandemic is catastrophic. Escalation of terrorism poses an enormous threat to contemporary international safety, while the occurrence of attacks with means of mass

¹ Strains are officially kept for scientific purposes at the Center for control and Prevention of Infectious Diseases (Centers for Disease Control and Prevention – CDC) in Atlanta (USA) and secret government laboratory in Novosibirsk (Russia).

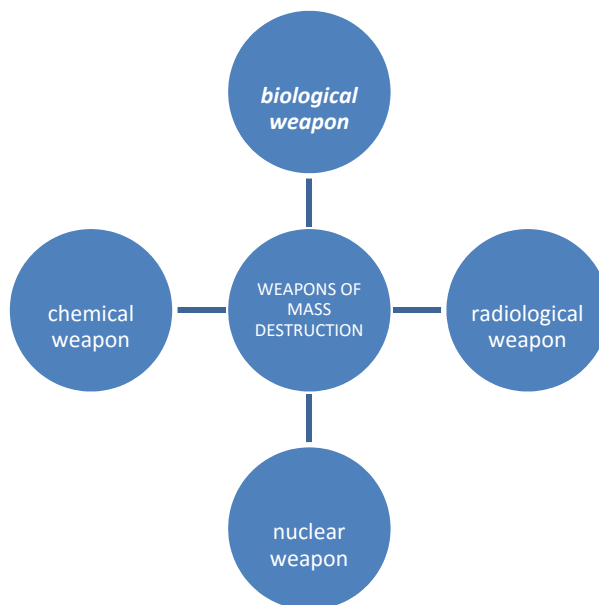
destruction is becoming more and more realistic. Therefore, a possibility of CBRN application in terrorist attacks remains one of the most widely discussed aspects of terrorism, which also rises fears (Bolechów 2010, p. 188).

The aim of this article is to evaluate the level of the contemporary threat that biological weapons entail. The author is going to briefly present the genesis, characteristics and specificity of destruction as well as he is going to point out the necessity to counteract and fight with the threat.

CBRN

The term CBRN consist of a set of English words *chemical, biological, radiological, nuclear* and signifies *defence*, that is weapons illustrated in the figure 1.

Fig. 1: CBRN



Source: Author's own work.

The generally accepted ONZ definition implies that weapons of mass destruction are explosive atomic bombs, the weapons which are based on radioactive material, deadly

chemical weapons and biological weapons together with all future variants of weapons with damaging features like these of an atomic bomb and other kinds of weapons shown below².

In accordance with *NATO Glossary of Terms and Definitions* (2013), a weapon of mass destruction is defined as “a weapon that is capable of a high order of destruction and of being used in such a manner as to destroy people, infrastructure or other resources on large scale” (*NATO Glossary of terms and definitions* 2013, p. 420). A similar definition was proposed by Barry Buzan and Eric Herring (Buzan, Herring 1998, p. 45), according to them it is “a weapon which even in small quantities can very quickly and on large scale kill human beings and destroy inanimate objects”.

On the Polish ground *Leksykon wiedzy wojskowej* (1979, p. 53) defines weapons of mass destruction as “modern means of a fight intended to mass destruction of people, animals, plants, munitions and objects on large areas”. A similar approach is presented by authors of *Słownik terminów z zakresu bezpieczeństwa narodowego* (2008, p. 24-25) “weapons of mass destruction are modern kinds of weapons intended to mass destruction of people, munitions and objects located on large areas”.

As complemented by Bolesław Chocha (1974, p. 142) “near military objects some cities, industrial centres, communication junctions, etc. will be destructed and destroyed”. It is tantamount to the fact that unconventional kinds of weapons are characterised by huge destructive power, and results of their use should not be limited only to objects of infrastructure.

Jan Pięta perceives it in this way since he defines a weapon of mass destruction as “a modern weapon with a high order of destruction, whose destructive influence cannot be limited to certain military objects. Its use on a battlefield always brings pointless destruction and contamination of civil objects and the natural environment as well as suffering of people who are not directly involved in a fight” (Pięta 2006a, p. 4).

It is worth mentioning remarks made by Tadeusz Jemiolo (Jemiolo et al. 2004, p. 10), who reasonably notice that literal translation of the English name *weapons of mass destruction*, that is “broń masowego zniszczenia”, does not seem fully accurate because only one of them (a nuclear weapon) destroys infrastructure and munitions, whereas the others have an impact exclusively on life forms, thus accurate translation of the English name *weapons of mass destruction* should maintain the meaning “broń masowego rażenia”.

² Definition was presented in 1948 by a committee of the UN conventional arms.

What should be borne in mind is that CBN is the most dangerous means of fighting possible. It can be applied by armed forces of particular countries or terrorist groups.

The use of B and C categories of weapons, so called “atomic bombs for the poor”, are the most alarming because they are highly likely to be used owing to “easiness when it comes to extraction or making deadly micro-organisms and chemical substances” (Kiras 2009, p. 197). With regard to the aforementioned aspect the author is undertaking further reflections related to biological weapons and threats, which they entail nowadays.

Biological weapons – term, characteristics

Yonah Alexander and Milton M. Hoenig (2001, p. 116) claimed that “out of weapons of mass destruction biological ones are those which dread people the most”. Letting out this kind of a substance to the environment may bring unimaginable losses in terms of destruction of organisms and the environment. *NATO Glossary of terms and definitions* defines the biological weapon as “an item of material which projects, disperses, or disseminates a biological agent including arthropod vectors” (*NATO Glossary of terms and definitions* 201), p. 75). The term “biological agent” signifies “a micro-organism which causes disease in man, plants, or animals or causes the deterioration of material” (ibidem, p. 75).

The definition of western authors is mentioned for example by Zenon Żółtowski (1969, p. 10) “technical devices used to destroy or incapacitate only living forces of an enemy (people, domestic animals and crops) with the help of so-called warfare biological agents”, whereby “warfare biological agents” are understood as “some categories of pathogenic micro-organisms, bacterial toxins as well as some chemical compounds used to destroy or damage crops or a an area” (Żółtowski 1969, p. 10).

On the Polish ground *Encyklopedia PWN* (password: “biological weapon”) suggests a definition according to which biological weapons mean “life forms (bacteria, viruses, protozoa, fungi) and substances produced by them, as well as some higher organisms (infected rodents, insects) together with means of their transfer and proliferation to cause mass infectious diseases (epidemics) of people, animals and plants”.

Jan Pięta (2006b, p. 7) points out that biological weapons are “life forms (bacteria, viruses, protozoa, fungi) and substances produced by them, as well as some higher organisms (infected rodents, insects) together with means of their transfer and proliferation intended to cause mass infectious diseases (epidemics) of people, animals and

plants)”. Therefore, biological weapons are means of mass destruction of people and food by pathogens and toxins, which are produced by bacteria and viruses (Michailiuk, Malicki 2003, p. 137). Jacek Pawłowski (2004, p. 86) complements the aforementioned list, putting the emphasis on the fact that “it is possible to produce synthetic toxins which influence genetic traits of organisms”.

In accordance with Act of 5th December 2008 *on prevention and combating infectious and infectious diseases in humans* (Ustawa z 5 grudnia 2008 r. o zapobieganiu oraz zwalczaniu zakażeń i chorób zakaźnych u ludzi, art. 2 point 2) a biological agent constitutes “germs in cells capable of causing pathogenic symptoms or products formed by them, internal and external parasites in humans or products formed by them, acellular molecules capable of replication and transferring genetic material, including genetically modified cell cultures or products formed by them”.

The essence of infectious diseases was discovered in the course of the research conducted in the 19th and 20th century, however the B weapon was a tool used during fights in the ancient times and the Middle Ages. To illustrate, the army of Alexander of Macedon, on the way back from the unsuccessful foray to India, left dead bodies of soldiers, who died of infectious diseases, in order to delay a possible chase on the part of enemy armies.

In the 14th century in the Eastern Europe bodies of victims of the Black Death or cholera used to be thrown over defensive walls (Rutkowska-Płachcińska 1978, p. 127). Moreover, the Spanish conquistador³, Pizarro, during the conquest of southern territories of the South America took advantage of pox germs (he gave people from local communities clothes which previously had belonged to those having the disease). Likewise, the commander of English armies, sir J. Amherst, used blankets infected by the poxvirus in the battle with the tribe supporting the French⁴, and in this way he caused a fatal epidemic of pox among Indians, which eventually weakened the French army. World War I enabled Germans to use the anthrax bacterium that destroy transport of mules and horses (from Romania, Argentina and the United States).

The most dangerous means of the B weapon are:

- bacterial weapons (e.g. anthrax);
- virus weapons (e.g. Ebola virus);
- rickettsia weapons (e.g. typhoid fever);

³ At that time (year 1495) the Spaniards in the battle against the French, the blood of patients with leprosy poisoned wine French troops.

⁴ The thing took place in North America during the Franco-British, which was conducted in the years 1745-1767.

- fungus weapons (mycotoxins).

Detailed information concerning particular groups are illustrated in the table 1.

Tab. 1. Types and agents of biological weapons and characteristics of infection

Type of biological weapon	Means of biological weapon	Characteristics of infection
Bacterial weapon	Ebola virus	In the initial stage symptoms resemble infection. Then so-called viral hemorrhagic fever occurs (headaches, muscle aches, diarrhoea, internal and external haemorrhage). Infection contributes to incredibly high mortality rate.
	cholera	Infection manifests itself by general weakness of an organism. Sweating, diarrhoea and vomiting occur, which may lead to considerable dehydration and even death.
Virus weapon	plague	Symptoms of infection are headaches, high temperature as well as swollen lymph nodes. In the case of so-called pleural plaque pneumonia, dyspnoea and spitting blood occur. Death comes within few hours.
	anthrax	In the initial stage symptoms resemble infection. Most often we deal with the skin form (about 95% of infections), which is characterised by ulceration with a dark scab. Moreover, the pulmonary and alimentary forms occur.
Rickettsia weapon	typhoid fever	Symptoms of infection are stomach aches, diarrhoea, vomiting, with high temperature. Moreover, intoxication, rash, intestinal haemorrhage and a feeling of extreme exhaustion occur.
Fungus weapon	mycotoxins	Infection causes chronic diseases, in particular of respiratory system, respiratory disorder, infections and neoplasm.

Source: Author's own work based on: Chomiczewski et al. (2002); Langbein et al. (2003); Michailiuk (2004).

Features of biological agents that influence their effectiveness are:

- easiness of proliferation;
- invisibility during an attack;
- easiness when it comes to hiding and transferring;
- low traceability in the initial phase of an attack;

- possibility of infection via direct contact;
- high mortality rate (e.g. anthrax approx. 80%, Ebola virus approx. 76%);
- low molecular mass that can facilitate dispersal (1-5 mm) in the form of aerosol;
- considerable resistance to external factors (e.g. sunlight);
- an element of contamination may be any element of the ecosystem (e.g. air, soil, water);
- lack of any vaccines, medicines and efficient treatment or insufficient quantity or quality of them (Plusa, Jahnz-Różyk 2002, pp. 3-4);
- considerable difficulty in quick recognition of causes leading to getting sick or dying, and therefore difficulty in discerning the fact of its use;
- possibility of dissecting in a special way (e.g. through genetic modification) with view of increasing mortality rate or ability to survive to the natural environment;
- easiness of obtainment and production on large scale (using a base of pharmaceutical industry, fermentative industry, small laboratories and analytical workshops);
- considerable efficiency (using 50 kg of anthracis gemmae in the form of aerosol 2 km high during an attack on a 500-thousand city will cause 125 thousand casualties causalities and 95 thousand fatalities);
- low costs of production – “weapons of mass destruction for the poor”, the costs of causing losses among people on the area of 1 km² may be as low as 1 USD; compare: chemical weapons – 800 USD, traditional weapons – approx. 2 thousand USD (Michailiuk 2004, p. 36).

The figure 2 shows potential ways of infection by biological agents.

The use of biological weapons may take place as a result of substituting infected food, clothes, dressing materials. Contamination of water or sending it by post are another alternatives. Invisible enemies may be spread via their natural carriers, such as insects (fleas, lice, bedbugs) as well as rodents (mice, rats). Some types of biological weapons are characterised by their capacity to move freely in the air, which substantially facilitates their proliferation. With regard to the aforementioned aspects, the B weapon may be spread via gunnery, mortar, missile attacks, aerial bombs, planes⁵, through dropping special containers with infected insects, ticks and rodents (*Leksykon Wiedzy Wojskowej*, p. 52).

⁵ Also common agricultural.

Fig. 2. Ways of infection by biological agents



Source: Author own work on the basis of the Chocha (1974), p. 162.

Bioterrorism

Professor Wiesław Deptuła states that “bioterrorism is terrorism that takes advantage of biological agents. They are bacteria, viruses, toxins, so those germs which can be found in nature. However, people are capable of creating as if new organisms, even more dangerous than those found in nature. And they use them in order to cause and spread diseases. Thus, there is a prefix *bio* – in front of terrorism” (Kozicka 2003, p. 6).

Thereby, bioterrorism is the unlawful, illegal use of agents of biological origin (bacteria, enzymes, their toxins, parasites, viruses and other materials of biological origin) against living organisms (people, plants or animals) to threaten them or enforce desirable action of administrative organs or civilians so as to achieve personal, political, religious or social goals (ibidem).

Proliferation of weapons of mass destruction and terrorism are currently deemed key threats worldwide. The combination of those two threats appears to be catastrophic,

and both phenomena may be connected with each other since terrorists can use CBRN in order to conduct a terrorist attack (Żuber 2006, pp. 131-141). Terrorism with the use of CBRN is defined as super terrorism or mass destruction terrorism, that is an extremely dangerous kind of terrorism. Stanisław Koziej rightly notices that “disposition of these weapons on the part of terrorist groups may not only mean physical possession, but also it may entail a diversionary break-in into existing security systems or systems related to steering nuclear weapons and in this way obtaining access to these weapons” (Koziej 2012, p. 33).

Contemporary level of B weapon threat

Ken⁶ Alibek (Alibek 2001, p. 35) indicated a very important and still significant problem of ignoring the threat concerning B weapons “we see that attention is drawn to nuclear bombs. But why should we worry about biological weapons? (...) they can be easily prepared and easily produced (...) and also it is easy to stealthily escape from a place where they were used and even from a country to use them”. Using pathogens as warfare agents is a realistic threat to the modern battlefield. According to experts biological weapons can be used both in military operations, despite signed conventions and treaties, and in terrorist attacks” (Płusa, Jahnz-Różyk 2002, p. 4).

Since time immemorial pathogenic micro-organisms have been used during wars as one of agents to eliminate power of a living enemy. Infectious diseases (including endemic ones) have decimated armies and repeatedly led to considerably greater losses than undertaken military operations. Nowadays, in the world threatened by CBRN terrorism, there is an anxiety that B weapons may get into the wrong hands and may be used in any place and time (Moore 2009, p. 53). There is still a possibility to use biological weapons in diversionary and sabotage operations, therefore the threat should be treated seriously.

As regards the context of military operations, biological weapons are perceived as one of future types of means of fighting. Directions in research concerning them depend on scientific and technological progress as well as on demand on the part of the battlefield. Furthermore, what speaks in favour of using B weapons are arguments related to a wide spectrum of possibilities to employ them in diversion, as well as their

⁶ As Kanatjan Alibekow was the director of Soviet scientific research program on biological weapons. In 1988-1992 he worked as deputy director of the „Biopreparation”, the Soviet institution of the pharmaceutical, whose main goal was to develop a B weapon. “Biopreparation” oversaw about 40 secret research institutes in Russia and Kazakhstan. In 1992 he fled to the USA and adopted new name – Ken Alibek.

exceptional advantages are pointed out when it comes to realisation of various types of psychological wars (Żóltowski 1969, p. 11).

The psychological meaning of using biological weapons is based on arousing fear, symptoms of hysteria and disorganisation of social life (Chomiczewski et al. 2001, p. 19). P.L. Williams (2009, p. 209) accurately noted that September attacks from 2001 “more than any other events contributed to the anxiety that Al-Qaeda may take advantage of weapons of mass destruction in the next place”. Unpredictability, cruelty and a spectacular atmosphere, which are desirable by terrorists seem to be at the disposal when weapons of mass destructions are used during an attack. Nowadays, such priceless information along with technological achievements make it easy for terrorists to perform a precise bio attack on any chosen object. It is not a problem for contemporary terrorist organisations to access biological agents, whose use may bring about physical destruction to a potential target (Liedel, Piasecka 2008, p. 28).

Terrorists may come into possession of pathogens enabling them to conduct a bio attack via (Alexander, Hoenig 2001, p. 25):

- isolating and breeding necessary pathogens derived from natural sources;
- purchasing biological agents in one of functioning germs storehouses;
- theft from hospital, research centre, laboratory of public health centres;
- obtaining biological agents from a country which is divided, fragile, from a government scientist or a national sponsor.

What makes biological weapons appealing to terrorists? K. Langbein et al. (2003, pp. 9-10) provide the answer: “there is no other form of leading a war with a better trained and armed enemy which could work so effectively, neither there is any weapon that could be so easily hidden, cheap to produce and which with relatively low outlay could cause such great mass losses in humans as biological weapons”.

The use of a biological agent against people would have especially drastic results if terrorist used micro-organisms transferred from one person to another. This type of an attack would cause unimaginable consequences, which would be strengthened by the fact that in spite of the awareness about a danger only few countries, cities, villages are appropriately prepared for an epidemic. Moreover, if biological weapons are to be used effects such as obligatory quarantine, mass emigration of people from endangered areas, resignation from medical personnel and even a civil war ought to be taken into account. K. Alibek (2000, p. 10) reckoned that “certainly it is what a war will look like in the 21st century”.

Using biological weapons can take place when it comes to food, by contaminating water or for example infecting dressing material, clothes or letters.

The problem is that it is extremely difficult to produce a deadly strain of a given germ in quantities that would allow to infect a vast number of people.

The threat of the use of biological weapons is frequently perceived as a kind of exaggeration. Experts who hold the view that those fears are magnified indicate that this approach aggravates proper evaluation of a potential danger. Anywise, the world is not free from the danger, which can be posed by using bacteria as weapons of mass destruction. Furthermore, the reality after the Cold War has successively brought an end to ideological, information and technological restrictions, which previously had prevented terrorists from using deadly weapons (Hoffman 2001, p. 188).

In the face of current tensions, in particular between Western Europe and Arab countries, it is increasingly likely that a bioterrorist attack will occur. It cannot be overlooked that there are rational premises which prove the potential use of micro-organisms. What is incredibly attractive and encourages the use of biological weapons is the fact that this kind of an attack could not meet an equal act of retaliation. Due to interacting of cultures in the contemporary world and the fact that contemporary international terrorism poses a danger to social order, international relations, and even to people (Liedel, Piasecka 2008, p. 8) if means of mass destructions are used, biological weapons may be employed not only by large terrorist organisations, but also by entities which do not conform to the present order of the world.

Terrorism as a tool “gained a capacity to adjust to changing conditions, needs, and also cultural disparateness of people and organisations, which employ them” (Ibidem, p. 9). European countries are more and more frequently victims of attacks performed by radical Islamists coming from different parts of the world. Nowadays there are also cases in which warfare agents of this type are used by terrorists, and this practice is called bioterrorism and it may pose a danger to citizens to each country in the world.

So far the most famous instance of using B weapons took place in 2001, when parcels containing endospores of bacillus anthracis were sent. As a result 22 people were infected (11 – skin, 11 – lungs), out of whom 5 died (pulmonary form) (Chomiczewski 2003). Among the recipients of parcel posts were both national institution (in particular post offices) and individual citizens. Parcels containing white powder were addressed to the Capitol, congressmen’s houses as well as to employers of the broadcast television NBC, greatest newspapers “The Times” and “The Sun” (Prusakowski 2001, pp. 28-31). Similarly in Poland there was an incident in which bacillus anthracis was used. Namely,

in Poland in October and November 2001 parcels with white powder appeared, which caused a wave of panic among a plethora of citizens and costly detailed action was undertaken by proper services, especially in some microbiological laboratories (850 probes were checked in the research to find bacillus anthracis) (Chomiczewski et al., 2002, p. 32). Moreover, white powder was addressed to the United States embassy in Vilnius (Prusakowski 2001, p. 28). Biological attacks caused unspeakable panic and as a consequence numerous false alarms were raised concerning suspicious parcels, which caused considerable economic losses in the United States and other countries.

Nowadays, important tasks of national authorities and international organisations revolve around providing security and avoiding any danger which is related to undertaking activities that can help to protect and defend a country. With regard to this aspect, it seems to be appropriate to adequately train and equip particular persons responsible for defence against bioterrorism. It is worth improving effectivity of those working on monitoring, analysing and forecasting hazards.

One of main tasks of national security is to prevent any danger stemming from weapons of mass destruction (including biological weapons) by means of for example:

- counterproliferation (prior restrictions to spread weapons of mass destruction);
- non-proliferation (control of access to weapons of mass destruction: materials, technologies, expert reports etc.);
- effective overcoming and minimising effects of the use of weapons of mass destruction.

The ban on using CBRN as a weapon, which entails pointless destruction and suffering of people, derives from accustomed law principles of war and international arrangements. Works concerning regulating the problem of the use of weapons are being undertaken. Introduced restrictions are directly related to armed forces and militarisation, their quantitative and qualitative parameters as well as location and behaviour.

The most important document regarding the international law on non-proliferation of biological weapons is *Convention on the prohibition of the development, production and stockpiling of bacteriological (biological) and toxin weapons and on their destruction*, that is *The Biological and Toxin Weapons Convention* (BTWC).

The issue of using various types of biological agents in order to deliberately spread infectious diseases in people, animals and plants is universally more condemned by international society than the use of chemical weapons.

Conclusions

The aim of the author of this article was to indicate the level of danger that is posed by the possibility of the use of biological weapons against contemporary communities. Not only did it require to present a few historical facts, but also it required to show potential types of weapons of mass destruction, the essence of the use of pathogenic germs against people and the environment.

Due to a possibility of causing great losses (entities and their resources) on a considerable area, biological weapons may be categorised as strategic weapons. Easy access and simplicity in the use of “invisible killers” implies the necessity to defend against an bioterrorist attack.

Biological weapons are the oldest kind of weapons of mass destruction since it was used on the battlefields in the Middle Ages, and the simplest form was spread around 300 years BC (Iwanna 2004, p. 5). In the course of time it evolved so as to in the 21st century it has become one of the greatest dangers to international law and order. Contemporary fears concerning the use of biological weapons are related to thoughtful performances of armies, terrorist groups and individual bioterrorist incidents initiated by maniacs. It is all attributable to the currently noticeable process of spreading biotechnology as well as easy access to a wide range of laboratory instrumentation that is crucial to produce biological weapons.

It seems that from the World Trade Center attack on 11th September 2001 effects of even a single, precisely performed biological attack may be too great to be ignored. The use of these weapons, even if in a remote country, can be a reason of occurrence of infectious diseases in another country (and even another continent), which is encouraged by quick and mass migrations of people. Leaving aside the equipment of terroristic organisations, it must be underlined that the biological weapon is a kind of a future warfare agent⁷, which within several years may be found in the military equipment. Available source materials allow for a statement that works on biological weapons are based on growing germs that cause programmed diseases in humans, animals and plants. De facto the history of germs evolution is “the history of successes in attacking people, and many of them are incredibly easy to grow. Tiny dish of powder or few infected animals may cause mass destruction that will be extremely difficult to stop” (Moore 2009, p. 101).

Therefore, it is worth treating threats of the biological weapon as still prevailing and we should be cautious in case they are used.

⁷ In addition to geophysical, ozone, vacuum, plasma or tory weapons.

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