Historical Precedence and Technical Requirements of BW Use

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Overview

- Current Threat Assessments
  - Methodological Determination of Threat
    - Historical Determinists
    - Scientific Determinists
- Historical Record
  - State Actors
  - Sub-State Actors
- Technical Hurdles
  - Skill/Expertise/Educational Attainment
  - Pathogen Characteristics
  - Steps for Deployment
- Assessing the Threat

Current Threat Assessments

- **Methodological Determination of Threat**
  - **Two general methodological approaches**
    - **Historical Determinists**
      - **Utilize historical precedence of research, development, and use to determine future threat**
      - **Both States and Sub-State Actors equally capable**
      - **Low probability/low consequence**
    - **Scientific Determinists**
      - **Utilize assessment of scientific skill/expertise needed to manipulate pathogens or toxins into a weapon**
      - **States are the primary threat**
      - **Low-high probability/high consequence**

Terms and Definitions

- **Biological Weapon: Any pathogen or toxin used in a nefarious way against a human, animal, or plant target.**
  - **HCPTs – High Consequence Pathogens and Toxins**
- **Bioterrorism: The unlawful threat of, or use of, viruses, bacteria, and/or toxins against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political, social, and/or economic objectives.**
- **High Consequence Event (can be one or a combination of the following):**
  - **Physical Damage**
  - **Economic Impact**
  - **Mass Casualties**
  - **Social Disintegration**

State BW Programs (1914-Present)

- **World War I**
  - Germany, France - Sabotage program (non-human targets)
- **The Inter-War Years**
  - France, Japan, the USSR, the UK, Canada – Human, animal, plant research
    - Japan Begins Human Experiments
- **World War II – 1972**
  - Germany, Japan, USSR, US, UK, Canada
    - Japanese Use Against Chinese Targets
    - Alleged USSR Use Against German Soldiers
- **Suspected BW Programs Since 1972**
  - USSR/FSU, Iraq, Iran, China, Syria, Libya, India, Pakistan, North Korea, South Africa, Bulgaria, Sudan, Cuba, Israel, and Egypt.
- **Motivation for BW Programs**
  - Suspicion/Lack of Transparency Measures

State Actor Use

- World War I
  - Germany
    - Anti-Livestock
  - France (Alleged)
    - Anti-Livestock
- World War II
  - Japan
    - Anti-personnel
  - USSR (Alleged)
    - Anti-personnel
- Other Incidents
  - Bulgarian Assassination
  - South Africa BW Program (Alleged)
    - Assassination of Anti-Apartheid Opponents
    - Use During Zimbabwe (now Rhodesia) Independence War

BW Motivation of Sub-State Actors

- **Social Revolutionaries**
  - Goal: Replace capitalist political, economic, and social system with socialism within their own state
- **Nationalist-Separatists**
  - Goal: Establishment of autonomy/sovereignty based on group characteristics
- **Religious Groups**
  - Goal: Creation of specific religious, social, and/or political order
- **Single Issue Groups**
  - Goal: Advancement of particular political, social, and/or economic position
- **Right Wing Groups**
  - Multiple Goals: Decentralization of government; Ayrian purity; anti-taxes
- **Lone Actors**
  - Goals: Specific to each actor

Sub-State Actors: Incidents

Individual/Group	Type of Group	Year	Agent(s)	Relative Success
Pancho Villa	Nationalist-Separatist	1910	Botulinum toxin	Unknown
Palestinian Jewish Groups	Nationalist-Separatist	1947	*Vibreo cholerae*	Unknown
Mau-May	Nationalist-Separatist	1952	African Milk Brush	Eight steers killed
Dark Harvest	Single-issue	1981	*Bacillus anthracis*	Unsuccessful
Rajneeshee	Religious	1984	*Salmonella typhimurium*	776 people sickened
The Breeders	Single-issue	1989	Medfly	Unknown
Aum Shinrikyo	Religious	1990-1995	Bot Tox, *Bacillus anthracis*	Unsuccessful
Afghani Warlord	Nationalist-separatist	1995	Hepatitis	Unknown
Unknown-Nazi Sympathizers	Right-wing	1999	Unspecified medical waste	Unsuccessful
Dan Savage	Lone actor/SI	2000	Influenza	One person sickened (unrelated)
Palestinians	Nationalist-separatist	2000	Salmonella	Unknown–operational for18 mos.
Israeli settlers	Nationalist-separatist	2000	Sewer Water	Possible crop damage
Unknown	Unknown	2001	*Bacillus anthracis*	22 killed/injured

Sub-State Actors: Possession

Individual/Group	Type of Group	Year	Agent(s)
RISE	Single-issue	1972	Salmonella typhi
Minnesota Patriots Council	Right-wing	1995	Ricin
Thomas Lewis Lavy	Right-wing	1995	Ricin
Larry Wayne Harris	Right-wing	1995	Yersinia pestis
James Dalton Bell	Right-wing	1997	Ricin, botulinum toxin
PKK	Nationalist-separatist	1997	E. coli, botulinum toxin
Thomas c. Leahy	Lone Actor	1997	Ricin, “killer virus”
Hamas/Hezbollah	Religious/Nationalist-separatist	1997/1998	Unspecified BW components
PKK	Nationalist-separatist	1998	Cobra poison
Chechen Rebels	Nationalist-separatist	2000	Unspecified “biological agent”

General Pattern of Use

- States
  - During wartime conditions
  - Tactical, not strategic (influence battle, not war)
- Sub-states
  - Targeted (specific individual/group)
  - Localized event
  - Factors Possibly Influencing Decision to Use
    - Nationalist-Separatists – Less likely to cause long-term environmental contamination (e.g. Palestinian/Israeli settlers)
    - Single-issue/Right-wing – tend to be more interested in local issues (e.g. The Breeders)
    - Lone actor – no allies to aid with a BW attack (e.g Dan Savage)
    - Religious groups – apocalyptic pose the greatest threat (e.g. Rajneeshees, Aum Shinrikyo)

Examples of Pathogens/Toxins Developed and/or Used

Agent(s)	States	Sub-States
Bacterial	***Bacillus anthracis***, ***Yersinia pestis***, ***Francisella tularensis***, ***Brucella*** spp., ***Salmonella*** typhi	***Bacillus anthracis, Yersinia pestis, Vibreo cholerae, Salmonella typhimurium, Salmonella*** typhi, ***E. coli***
Rickettsial	***Rickettsia prowazekii, Coxiella burnetii***	
Viral	***Variola major***, influenza spp., yellow fever viruses, various encephalitis viruses, hemorrhagic fevers viruses	Hepatitis spp., influenza spp.,
Toxins	Botulinum, staphylococcus enterotoxin, shigella, aflatoxin	Botulinum, ricin
Fungal	Coccidiodomyocosis	
Other	Anti-plant/Anti-animal	African Milk Bush, Medfly

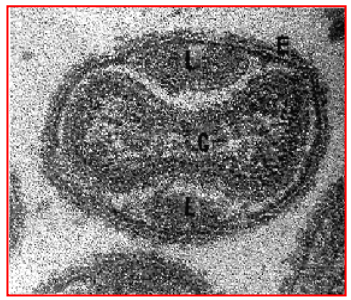
Scientific Skill and Expertise Needed

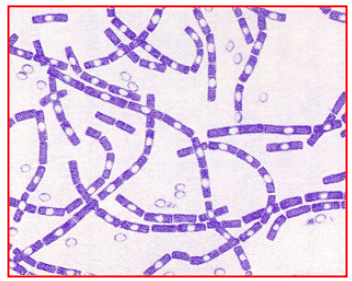
- **High School Diploma**
  - Grow and culture bacteria, needs detailed/specific instructions, needs supervision
- **Associates Degree**
  - Technical-level work, prepare culture media, culture most aerobic/anaerobic gram positive and negative bacteria, culture viruses, basic testing
- **Baccalaureate Degree**
  - Experimentation under supervision, laboratory qualified
- **Masters Degree**
  - Junior scientist, microbiology section of lab, pharmaceutical/biotech industry, formal hypothesis testing and experimentation, knowledge of procedures useful to weaponization
- **Doctoral Degree**
  - Head of own research lab – no supervision, DNA/genetic modification and experimentation

Bio Agent Characteristics

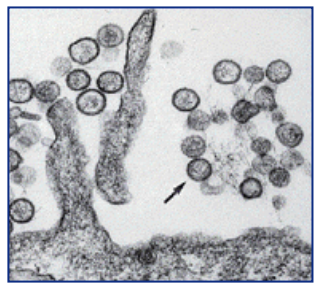
- Availability
- Infectivity
- Pathogenicity
- Transmissibility
- Availability of Countermeasures/Immunity
- Environmental Hardiness
- Ability to Camouflage as an Endemic/Common Disease

Variola major





Bacillus anthracis



Sin Nombre Virus (causal agent for HPS)

Steps for Deployment

- Acquisition of Virulent Pathogen or Toxin
  - Assessment of Bio Agent Characteristics
- Production of Material
- Processing of Material
  - To resist environmental stressors
  - To survive dissemination
  - To increase the pathogens' or toxins' infectivity and/or pathogenicity
- Employing a Delivery Form or Device
  - Inhalation
  - Ingestion
  - Dermal
  - Other
- Deploying the Agent in Ideal Weather/Indoor Conditions

Who is Likely to Utilize a BW?

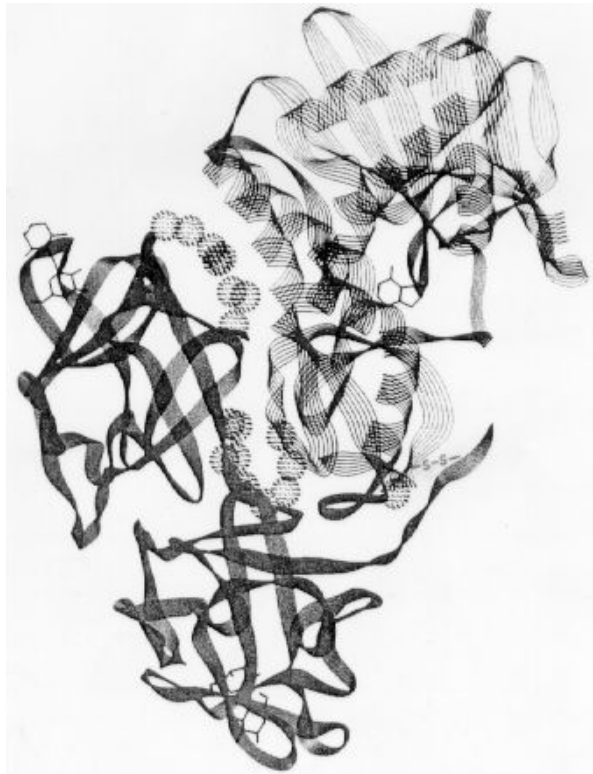
- **Sub-State Actors**
  - **All types of sub-state actors have been willing to utilize BW at any time**
    - **Religious, apocalyptic willing to utilize HCPTs – were unable to effectively deploy**
    - **Unwilling or Unable?**
  - **Localized events**
  - **Specific targets**
    - **Smaller quantities**
- **State Actors**
  - **States with BW programs have been willing to use BW in wartime situations**

Why May a BW Be Utilized?

- **Sub-State Actors**
  - **Instill fear**
  - **Assassination**
  - **One of many different types of weapons**
    - **May prefer “instant” gratification of explosives**
- **States**
  - **Wartime (Germany, France, Japan, USSR)**
    - **Tactical**

What BW are Likely to be Utilized?

- **Sub-State Actors**
  - Ricin and botulinum toxin utilized most often
  - Other BW includes Salmonella spp., influenza, and hepatitis
  - Overall, sub-state actors utilize BW that:
    - Require little educational training
    - Require little manipulation
    - Are easily deployed
- **State Actors**
  - Wide-array of available agents
  - High consequence event



Ricin

How Would BW Likely be Deployed?

- **Sub-State Actors**
  - **Crude dissemination methods including:**
    - **Placing the agent (e.g., door knob)**
    - **Contaminating food or water**
    - **Delivering the agent (e.g., mail)**

- **State Actors**
  - **Sophisticated dissemination methods including:**
    - **Aerosolization**
    - **Utilization of vectors**

What are the Likely Consequences of a BW Event?

- **Sub-State Actors**
  - Low fatality biological agents
  - Non-sophisticated dissemination techniques
  - Likely low consequence event
- **State Actors**
  - Higher fatality biological agents
  - Range of dissemination techniques
  - Possible high consequence event