

**AD HOC GROUP OF THE STATES PARTIES  
TO THE CONVENTION ON THE PROHIBITION  
OF THE DEVELOPMENT, PRODUCTION AND  
STOCKPILING OF BACTERIOLOGICAL  
(BIOLOGICAL) AND TOXIN WEAPONS  
AND ON THEIR DESTRUCTION**

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**PROPOSED TEXT FOR ARTICLE III – DECLARATIONS**

**I. LISTS AND CRITERIA (AGENTS AND TOXINS)**

1. The following lists of human and animal pathogens and toxins are intended for use with Article III, section D, subsection I, part G<sup>1</sup> and for any other declaration in section D involving a list of agents and/or toxins.

2. As the human and animal pathogens and toxin lists will be hard to define we propose several tables of enlisted pathogens and toxins with important criteria on the basis of which a decision can be made to include in or exclude from a list of bacteriological (biological) agents and toxins. These tables are preliminary and can serve as the basis for discussion and as help on defining the final list of bacteriological (biological) agents and toxins.

**CRITERIA FOR HUMAN PATHOGENS AND TOXINS**

[The following criteria were discussed by the Group and may be used in combination for selection of human pathogens and toxins to be included in a list of bacteriological (biological) agents and toxins:] (see tables 1, 2 and 3)

1. [Vectors or] Agents known to have been developed, produced, stockpiled or used as weapons;
2. Likely methods and high level of dissemination or cover a large area as aerosol, spores in aerosol, sabotage (food and water supply), infected vector;
3. Low infection dose or high toxicity [or potency];
4. High level of morbidity [and short incubation or latent period];
5. High level of contagiousness in population (transmissibility man to man especially through contact);

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1. Work with listed agents and/or toxins.

6. Infection or intoxication [by variety of route, especially] by respiratory route;
7. High level of incapacity or mortality;
8. Stability in the environment;
9. No effective prophylaxis (i.e. immune sera, vaccines or antibiotics) and/or therapy commonly available and widely in use;
10. Difficulty of detection or identification [at the early stage];
11. Ease of production [and transportation].

#### ADDITIONAL CRITERIA FOR TOXINS

The following additional criteria can be discussed by the Group and may be used in combination for selection of toxins to be included in/excluded from a list of toxins (see table 4):

##### **Toxicity or potency:**

- 1 = Effective dose for 50% or ED<sub>50</sub> (and LD<sub>50</sub>) in the 10<sup>-9</sup> g/kg range.
- 10 = Effective dose for 50% or ED<sub>50</sub> (and LD<sub>50</sub>) in the 10<sup>-3</sup> g/kg range.

##### **Onset:**

In this table, immediate (battlefield relevant) onset rather than delayed (terrorist relevant) onset is considered desirable.

- 1 = Minutes to hours onset.
- 10 = Multiple hours or days to onset.

##### **Level of incapacity/mortality:**

The number assigned in the table depends on whether the goal is to hinder the enemy or to kill.

- 1 = Severely incapacitating.
- 10 = Invariably lethal.

##### **Likely methods of dissemination:**

- 1 = Toxin could be aerosolized and delivered to cover large areas for aerosol contamination. Toxin could be used in sabotage for contamination food and water.
- 10 = Toxin could not be aerosolized and delivered to cover large areas for aerosol contamination. Toxin could be difficult used in sabotage.

##### **Stability in environment/storage:**

This factor refers to stability in storage or weapons and environment.

- 1 = Extremely stable in storage and environment.

10 = Unstable in environment or requires special storage conditions.

**Ease of decontamination:**

1 = Extremely difficult to decontaminate after a toxin aerosol attack.

10 = Decontamination would be relatively unimportant and general decontamination procedures effectively destroy toxin.

**Production** (Ease of production and transportation):

1 = Low technology, low cost, widely available (e.g. fermentation).

10 = Cutting edge, high cost, only available to specialized teams (e.g., solid phase synthesis of >100 amino acid polypeptides, advanced genetic manipulation).

## CRITERIA FOR ANIMAL PATHOGENS

The following criteria were discussed by the Group and may be used in combination for selection of animal pathogens to be included in a list of bacteriological (biological) agents and toxins (see table 5):

1. [Vectors or] Agents known to have been developed, produced or used as weapons;
2. Agents which have severe socio-economic and/or significant adverse human health impacts to be evaluated against a combination of the following criteria:
  - (a) High morbidity and/or mortality rates;
  - (b) Short incubation period and/or difficult to diagnose/identify at an early stage;
  - (c) High transmissibility and/or contagiousness;
  - (d) Lack of availability of cost-effective protection/treatment;
  - (e) Low infective/toxic dose;
  - (f) Stability in the environment;
  - (g) Ease of production.

## CRITERIA FOR PLANT PATHOGENS

The following criteria were discussed by the Group and may be used in combination for selection of animal pathogens to be included in a list of bacteriological (biological) agents and toxins (see table 6):

1. [Pests or] Agents known to have been developed, produced or used as weapons;
2. Agents which have severe socio-economic and/or significant adverse human health impacts, due to their effect on staple crops, to be evaluated against a combination of the following criteria:
  - (a) Ease of dissemination (wind, insects, water, etc.);
  - (b) Short incubation period and/or difficult to diagnose/identify at an early stage;
  - (c) Ease of production;
  - (d) Stability in the environment;
  - (e) Lack of availability of cost-effective protection/treatment;
  - (f) Low infective dose;
  - (g) High infectivity;
  - (h) Short life cycle.

For all pathogens and toxins there are not enough correct data for first criteria in open literature:

[Vectors or] Agents known to have been developed, produced or used as weapons.

#### REFERENCES:

1. Geissler, E.: *Biological and Toxin Weapons Today*. SIPRI, Oxford University Press, Oxford, 1986
2. Mandell, G., Douglas, R., Bennett, J.: *Principles and Practice of Infectious Diseases*, 3<sup>rd</sup> Edition. Churchill Livingstone, New York, 1990
3. Clark, K. The CWC: *Chemical and Toxin Warfare Agents and Disarmament*. Published by Cranfield University, Royal Military College of Science, Shrivenham, 1997
4. United States Department of Health and Human Services, Centers for Disease Control and Prevention/ National Institutes of Health CDC NIH, "*Biosafety in Microbiological and Biomedical Laboratories*", HHS Publication No. (CDC) 93-8395, 3rd Edition, May 1993, United States Government Printing Office, Washington, D.C., 1993
5. Perry Robinson, J.P.: *Chemical and Biological Warfare: developments in 1985*. In: SIPRI, World Armaments and Disarmament: SIPRI Yearbook 1986. Oxford: Oxford University Press, 1986

6. Hamilton, M.: *Toxin and Mid-Spectrum Agents*, The ASA Newsletter 93-3, 1998
7. Sanchez et al.: "*Sequence analysis of the Ebola virus genome: organization, genetic elements, and comparison with Marburg*", Virus Res., vol. 29, pp 215-240, 1993
8. Murphy, B.R. & Chanock, R.M.: *Immunization against viruses*. In: Fields, B.N., 1985
9. Hahn, C.S., Lustig S., Strauss E.G. and J.H. Strauss.: *Western equine encephalitis virus is a recombinant virus*. Proc. Natl. Acad. Sci. USA. 85: 5997-6001, 1988
10. Pfaff, E., Kuhn, C., Schaller, H., Leban, J.: *Structural analysis of the foot-and-mouth disease virus antigenic determinant*, 1985
11. Sakaguchi, G.: *Clostridium botulinum toxins*. *Pharmacology and Therapeutics*, 19: 165-1994
12. Morse, S.S. (ed.): *Emerging Viruses*. Oxford University Press, 1993
13. Geissler, E. and Woodall J.P.: *Control of Dual-Threat Agents: The Vaccines for Peace Programme*, SIPRI, Oxford University Press, 1994
14. Wiener, S.L. et al.: *Biological Warfare Defence*. In: *Trauma management*, W.B.Saunders Comp., Philadelphia, 1986
15. Manchee R.J. et al.: *Decontamination of Bacillus Anthracis on Gruinard Island?*, Nature 303, 239-240, 1983
16. Wiener SL, *Strategies of Biowarfare Defense*, Military Medicine 152, 25-28, 1987
17. Culliton, B.J.: *Emerging Viruses, Emerging Threat*. Science 247: 279- 280, 1990
18. Williams, L. & Westinf, A.H.: "*Yellow rain*" and the new threat of chemical warfare. Ambio (Stockholm), 1983
19. Monath, T.P.: *Yellow fever and dengue: The interactions of virus, vector, and host in the re-emergence of epidemic disease*. Semin Virol 5: 133-145, 1994
20. Büchen-Osmond, C., Crabtree, K., Gibbs, A. and McLean, G.: *Viruses of Plants in Australia*. 590 pp. Australian National University, Canberra, 1988
21. Manson-Bahr, D.E.C. and D.R. Bell.: *Manson's Tropical Diseases*. 19th edn. Bailliere Tindall, 1989
22. John D Steinbrunner: "*Biological Weapons: A Plague upon All Houses*", Foreign Policy, 85- 96, Winter 1997-98
23. C.J. Peters et al.: "*Filoviruses as Emerging Pathogens*", Seminars in Virology, vol. 5, pp 147-154, 1994
24. Murphy, F.A.: *Infectious Diseases*. Adv.Vir. Res. 43: 2-52, 1994
25. Peters, C.J.: *Molecular Techniques Identify a New Strain of Hantavirus*. ASM News. 60, 5: 242-3, 1994
26. Hall, S., Striclartz, G.: *Marine Toxins. Origin, Structure and Molecular Pharmacology*. Published by Am. Chem. Society, 1990
27. Hunter, S.: *Tropical Medicine*. 7th edn. W.B. Saunders Company, 1991
28. Conrad, et al.: "*Epidemiologic investigation of Marburg virus disease, Southern Africa, 1975*", Am. J.Trop. Med. Hyg., vol. 27, pp 1210-1215, 1978
29. Feldmann et al.: "*Molecular biology and evolution of filoviruses*", Arch.Virol (supp), vol. 7, pp 81-100, 1993
30. Geisbert, et al.: "*Association of Ebola-related Reston virus particles and antigen with tissue lesions of monkeys imported to the United States*", J. Comp. Path., vol. 106, pp 137-152, 1992

31. Halstead, S.B.: *Pathogenesis of dengue: Challenges to molecular biology* . Science; 239: 476. 1988
32. Halstead, S.B., Hoeprich, P.D., Jordan, M.C., Ronald A.R.: *Infectious diseases: A treatise of infectious processes*, 919-923, 1994
33. Advisory Commission on Dangerous Pathogens: *Categorisation of biological agents according to hazard and categories of containment*, Fourth Edition 1995, Her Majesty's Stationery Office, London, 1995
34. Statutory Instruments: *The Specified Animal Pathogens Order* 1993, 1993, No 3250, Her Majesty's Stationery Office, London
35. Brunt, A., Crabtree, K. and Gibbs, A.: *Viruses of Tropical Plants: Descriptions and Lists from the VIDE Database*. 707 pp. C.A.B. International, U.K., 1990
36. Council Directive: *On the protection of workers from risks related to exposure to biological agents at work*, 26 November 1990, 90/679/EEC, Official Journal of the European Commission, No. L 374/1, 31 December 1990, 1-12
37. Kuno, G.: *Review of the factors modulating dengue transmission*. Epidemiologic Reviews, 17(2): 321-335, 1995
38. Hughes, J.M. and J. R. La Montagne.: *The Challenges Posed by Emerging Infectious Diseases*. ASM News 60, 5: 248-50, 1994
39. Treanor, J. and B. Murphy: *Genes involved in the restriction of replication of avian influenza A viruses in primates*. In: *Applied virology research: virus variation and epidemiology*. Vol. 2. New York: Plenum Press (eds. Kurstak E., Marusyk R.G., Murphy F.A. and M.H.V. van Regenmortel), 1994
40. Brunt, A., Crabtree, K., Dallwitz, M., Gibbs, A. and Watson, L.: *Viruses of Plants: Descriptions and Lists from the VIDE Database*. 1484 pp. C.A.B. International, U.K., 1996
41. Jahrling et al.: *"Preliminary Report: isolation of Ebola virus from monkeys imported to USA"*, Lancet, vol. 335, pp 502-05, 1990
42. Morse, S.S. and A. Schluederberg: *Emerging Viruses: The Evolution of Viruses and Viral Diseases*. J. Inf. Dis. 162: 1-7, 1990
43. C.J. Peters et al.: *"Filoviruses"*, Chapt.15 in *Emerging Viruses* (ed. by S. Morse, Oxford University Press, New York), pp 159-75, 1991

**Table 1. Human pathogens (viruses) assessment according to criteria for selecting pathogens as BW**

Viruses	Weapo- nized	High level of dissemin- ation	Low in- fection dose	High level of morbi- dity	High con- tagiousness (transmissibility man to man)	Infection by variety of route (respiratory route)	High level of incapacity/ mortality	Stability in the environ- ment	Difficulty of detec- tion/iden- tification	No effec- tive pro- phylaxis and/or therapy	Ease of produc- tion	Totals +/-
Crimean-Congo HF virus	+	+	+	+	+	+	+	+	+	-	+	10/1
EEE virus	+	+	+	+	-	+	+	-	+	+	+	9/2
Ebola virus	+	+	+	+	+	-	+	-	+	+	+	9/2
[Sin Nombre virus]	-	+	+	-	-	+	+	-	+	+	-	6/5
[Hantaan virus]	+	+	+	+	-	+	-	+	+	+	+	9/2
Junin virus	-	+	+	+	-	+	+	-	+	+	-	7/4
Lassa fever virus	+	+	+	+	-	+	+	+	+	+	+	10/1
Machupo virus	-	+	+	+	+	+	+	-	+	+	+	9/2
Marburg virus	+	+	+	+	+	-	+	-	+	+	+	9/2
Rift Valley fever virus	+	+	+	+	-	+	-	+	+	-	+	8/3
Tick-borne enceph. virus	+	+	+	+	-	+	+	-	+	-	+	8/3
Variola major virus	+	+	+	+	+	+	+	+	+	-	+	10/1
VEE virus	+	+	+	+	-	+	+	-	+	-	+	8/3
WEE virus	+	+	+	+	-	+	+	-	+	-	+	8/3
Yellow fever virus	+	+	+	+	-	+	+	-	+	-	+	8/3
Monkeypox virus	-	+	+	+	+	+	+	+	+	-	+	9/2
Chikun-Gunya fever v. (CHIK)	-	+	+	-	-	+	-	-	+	+	+	6/5
Dengua fever virus	+	+	+	+	-	+	-	-	+	+	+	8/3
Omsk HF virus	-	+	+	+	-	+	-	-	+	+	+	7/4

**Table 2. Human pathogens (bacteria, rickettsiae, protozoa and fungi) assessment according to criteria for selecting pathogens as BW**

Bacteria Rickettsiae Protozoa Fungi	Weapo- nized	High level of dissemi- nation	Low infection dose	High level of morbi- dity	High contagiousness (transmissibility man to man)	Infection by a variety of route (respi- ratory route)	High level of incapa- city or mortality	Stability in the environ- ment	Difficulty of detec- tion/iden- tification	No effective prophylaxis (vaccina- tion)	No effective therapy (antimi- crobial)	Ease of produc- tion	Totals +/-
BACTERIA													
Bacillus anthracis	+	+	+	+	-	+	+	+	+	-	+	+	10/2
Brucella abortus	+	+	+	+	-	+	-	+	+	-	+	+	9/3
Brucella melitensis	+	+	+	+	-	+	-	+	+	-	+	+	9/3
Brucella suis	+	+	+	+	-	+	-	+	+	-	+	+	9/3
Burkholderia (Pseudomonas) mallei	+	+	+	+	-	+	+	+	+	+	-	+	10/2
Burkholderia (Pseudomonas) pseudomallei	+	+	+	+	-	+	+	+	+	+	-	+	10/2
Chlamydia psittaci	+	+	+	+	-	+	-	+	+	+	-	+	9/3
Francisella tularensis	+	+	+	+	-	+	+	+	+	-	-	+	9/3
Yersinia pestis	+	+	+	+	+	+	+	-	+	-	+	+	10/2
RICKETTSIAE													
Coxiella burnetti	+	+	+	+	-	+	-	+	+	-	-	+	8/4
Rickettsia prowazekii	+	+	+	+	-	+	+	-	+	+	-	+	9/3
Rickettsia rickettsii	+	+	+	+	-	+	-	-	+	+	-	+	8/4
PROTOZOA													
Naegleria fowleri	-	+	-	+	+	+	+	+	+	+	-	+	9/3
Naegleria australiensis	-	+	-	+	+	+	+	+	+	+	-	+	9/3
FUNGI													
Coccidioides immitis	-	+	-	-	-	+	+	+	+	+	-	+	7/5
Histoplasma capsulatum	-	+	-	-	-	+	+	+	+	+	-	+	7/5
Nocardia asteroides	-	+	-	-	-	+	+	+	+	+	-	+	7/5





**Table 3. Toxin assessment according to criteria for selecting toxins as TW**

Toxin/ Bioregulator	Weapo- nized	High toxicity	High morbidity	Intoxication by variety of route - respiratory route	High level of incapacity/ mortality	No effective prophylaxis/ therapy	Stability in the envi- ronment	Difficulty of detection/ identification	Ease of produc- tion	Totals +/-
Abrin	-	+	+	+	+	+	+	+	+	8/1
Aflatoxins	+	+	+	+	+	+	+	+	+	9/0
Anatoxin A	+	+	+	+	+	+	-	+	+	8/1
Batrachotoxin	-	+	+	+	+	+	-	+	+	7/2
Botulinum toxins	+	+	+	+	+	+	+	+	+	9/0
Brevetoxins	-	+	+	+	+	+	+	+	-	7/2
Bungarotoxins	+	+	+	+	+	+	-	+	-	7/2
Centruroides toxins	-	+	+	+	+	+	+	+	+	8/1
Ciguatoxin	-	+	+	+	+	+	-	+	-	6/3
Cyanginosins/Microcystins	-	+	+	+	+	+	-	+	-	6/3
Diphtheria toxin	-	+	+	+	+	+	-	+	-	6/3
Modeccin	+	+	+	+	+	+	+	+	+	9/0
Palytoxin	-	+	+	+	+	+	+	+	-	7/2
Ricin	+	+	+	+	+	+	+	+	+	9/0
Saxitoxin	+	+	+	+	+	+	+	+	+	9/0
Staphylococcal enterotoxins (SEB)	+	+	+	+	+	+	+	+	+	9/0
Shigatoxin	+	+	+	+	+	+	+	+	+	9/0
Tetanus toxin	+	+	+	+	+	-	+	+	+	8/1
Tetrodotoxin	+	+	+	+	+	+	+	+	-	8/1
Toxins of Cl. perfringens	+	+	+	+	+	+	-	+	+	8/1
Trichotecene Mycotoxins (T2,DON,HT2)	+	+	+	+	+	+	+	+	+	9/0
Verrucologen	-	+	+	+	+	+	-	+	-	6/3
Viscumin	-	+	+	+	+	+	+	+	-	7/2
Volkensin	-	+	+	+	+	+	-	+	-	6/3

[illegible]

**Table 4. Toxin risk assessment (the lower the total number means the more dangerous the toxin as TW)**

Toxin/ Bioregulator	Toxicity or potency	Onset	Level of incapacity/ mortality	Likely methods of dissemination	Stability in the environment/ storage	Ease of deconta- mination	Ease of production	Totals
Abrin	2	6	5	5	5	5	1	29
Aflatoxins	4	8	5	5	5	1	3	31
Anatoxin A	6	1	6	7	6	8	3	37
Batrachotoxin	5	1	6	4	9	8	8	41
Botulinum toxins	1	3	7	3	2	6	1	23
Brevetoxins	3	6	2	4	2	3	8	28
Bungarotoxins	3	4	6	5	8	7	8	41
Centruroides toxins	3	4	6	5	2	5	8	33
Ciguatoxin	3	7	6	6	8	5	9	44
Cyanginosins/Microcystins	6	2	5	3	7	7	8	38
Diphtheria toxin	2	3	6	5	5	7	3	31
Modeccin	3	6	5	4	5	5	1	29
Palytoxin	3	4	8	3	5	3	9	35
Ricin	3	6	8	3	2	5	1	28
Saxitoxin	3	2	8	3	3	7	5	31
Staphylococcal enterotoxins (SEB)	4	6	2	2	3	5	2	24
Shigatoxin	1	4	2	3	3	7	2	22
Tetanus toxin	1	9	8	4	3	7	2	34
Tetrodotoxin	3	4	5	3	5	5	9	34
Toxins of Cl. perfringens	3	6	8	3	3	7	3	33
Trichotecene Mycotoxins (T2,DON,HT2)	7	2	7	2	1	2	2	23
Verrucologen	3	7	6	5	6	6	3	36
Viscumin	3	6	5	5	6	6	1	32
Volkensin	4	5	7	6	7	5	4	38

Toxin/ Bioregulator	Toxicity or potency	Onset	Level of incapacity/ mortality	Likely methods of dissemination	Stability in the environment/ storage	Ease of deconta- mination	Ease of production	Totals
Endothelin/Sarafotoxin	1	1	7	2	3	5	4	23

**Table 5. Animal pathogens assessment according to criteria for selecting pathogens as BW**

Animal pathogens	Weapo- nized	Severe socio- economic/ human health impacts	High morbidity/ mortality rates	Short incubation period	High trans- missibility/ contagi- ousness	Low infective/ toxic dose	Difficult to diagnose/ identify at an early stage	Stability in the environ- ment	Cost- effective protection/ treatment	Ease of produc- tion	Totals +/-
VIRUSES											
African swine fever virus	+	-	+	+	+	+	+	+	-	+	8/2
Avian influenza virus	+	-	+	+	+	+	+	+	-	+	8/2
Camel pox virus	-	-	+	+	-	+	+	+	-	-	5/5
Classic swine fever virus	+	+	+	+	+	+	+	+	+	+	10/0
Foot and mouth virus	+	+	+	+	+	+	+	+	+	+	10/0
Newcastle disease virus	+	+	+	+	+	+	+	+	-	+	9/1
Pest des petits ruminants virus	+	-	+	+	+	+	+	+	-	+	8/2
Rinderpest virus	+	+	+	+	+	+	+	+	+	+	10/0
Porcine enterovirus type 1	+	+	+	+	+	+	+	+	-	+	9/1
Vesicular stomatitis virus	+	+	+	+	+	+	+	+	-	+	9/1
African horse sickness virus	-	-	+	+	-	+	+	-	-	+	5/5
Lumpy skin disease virus	-	-	-	+	-	+	+	+	-	-	4/6
MYCOPLASMAS											
Contagious bovine (pleuropneumonia) (M. mycoides var. mycoides) (CBPP)	-	-	-	-	+	+	+	+	-	+	5/5
Contagious caprine (pleuropneumonia) (M. mycoides var. capri) (CCPP)	-	-	-	-	+	+	+	+	-	+	5/5

**Table 6. Plant pathogens assessment according to criteria for selecting pathogens as BW**

Plant pathogens	Weapo- nized	Severe socio- economic/ human health impacts	Short incubation period	Ease of dissemination (wind, insects, water, etc.)	Short life cycle	Low infective dose and infectivity	Difficult to diagnose/ identify at an early stage	Stability in the environ- ment	Cost- effective protection/ treatment	Ease of produc- tion	Totals +/-
FUNGI											
Colletotrichum coffeanum var. virulans	-	-	+	+	-	+	+	+	-	+	6/4
Dothistroma pini (Scirrhia pini)	-	-	+	+	-	+	+	+	-	-	5/5
Claviceps purpurea	-	+	+	+	-	-	+	-	+	+	6/4
Peronospora hyoscyami de Bary	-	-	+	+	-	-	+	+	-	-	4/6
Puccinia graminis	+	+	+	+	-	+	+	+	-	+	8/2
Puccinia striiformis (P. glumarum)	-	+	+	+	-	+	+	+	-	+	7/3
Pyricularia oryzae	+	+	+	+	-	+	+	+	-	+	8/2
Ralstonia solanacearum	-	-	+	+	-	-	+	+	+	-	5/5
Sclerotinia sclerotiorum	-	+	+	+	-	+	+	-	-	-	5/5
Tilletia indica	+	+	+	+	-	+	+	+	-	+	8/2
Ustilago maydis	+	+	+	+	-	+	+	+	-	+	8/2
BACTERIA											
Erwinia amylovora	-	+	+	+	-	+	+	-	-	+	6/4
Xanthomonas albilineans	-	+	+	+	-	+	+	-	+	+	7/3
Xanthomonas campestris pv. citri	-	+	+	+	-	+	+	-	+	+	7/3
Xanthomonas campestris pv. oryzae	-	+	+	+	-	+	+	-	+	+	7/3
VIRUSES											
Sugar cane Fiji disease virus	-	+	+	-	-	+	+	-	-	+	5/5