ANNEX-4

MINISTRY OF ENVIRONMENT & FORESTS

NOTIFICATION

New Delhi, the 5th December, 1989

RULES FOR THE MANUFACTURE, USE/IMPORT/EXPORT AND STORAGE OF HAZARDOUS MICRO ORGANISMS/ GENETICALLY ENGINEERED ORGANISMS OR CELLS

(To be notified under the EP Act, 1986)

G.S.R. 1037 (E).- In exercise of the powers conferred by sections 6,8 and 25 of the Environment (Protection) Act, 1986 (29 of 1986) and with a view to protecting the environment, nature and health, in connection with the application of gene technology and micro-organisms, the Central Government hereby makes the following rules, namely:-

1. SHORT TITLE, EXTENT AND COMMENCEMENT

(1) These rules may be called the Rules for the Manufacture, Use, Import, Export and Storage of Hazardous micro-organisms/Genetically engineered organisms or cells.

(2) These rules shall come into operation on the date to be notified for this purpose in the Official Gazette.

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2. APPLICATION

(1) These rules are applicable to the manufacture, import and storage of micro-organisms and Gene-Technological products.

(2) These rules shall apply to genetically engineered organisms/micro-organisms and cells and correspondingly to any substances and products and food stuffs, etc., of which such cells, organisms or tissues hereof form part.

(3) These rules shall also apply to new gene technologies apart from those referred to in clauses (ii) and (iv) of rule 3 and these rules shall apply to organisms /micro-organisms and cells generated by the utilisation of such ether gene-technologies and to substances and products of which such organism and cells form part.

(1) These rules shall be applicable in the following specific cases:

(a) sale, offers for sale, storage for the purpose of sale, offers and any kind of handling over with or without a consideration:

(b) exportation and importation of genetically engineered cells or organisms:

(c) production, manufacturing, processing, storage, import, drawing off, packaging and repackaging of the Genetically Engineered Products:

(d) production, manufacture etc. of drugs and pharmaceuticals and food stuffs distilleries and tanneries, etc. Which make use of micro-organisms/ genetically engineered microorganisms one way or the other.

(4) These rules shall be applicable to the whole of India.

3. DEFINITIONS

In these rules unless the context requires.

(i) "Biotechnology" means the application of scientific and engineering principles to the processing of materials by biological agents to produce goods and services;

(ii) "Cell hybridisation" means the formation of live cells with new combinations of genetic material through the fusion of two or more cells by means of methods which do not occur naturally;

(iii) "Gene Technology" means the application of the gene technique called genetic engineering, include selfcloning and deletion as well as cell hybridisation;

(iv) "Genetic engineering" means the technique by which heritable material, which does not usually occur or will not occur naturally in the organism or cell concerned, generated outside the organism or the cell is inserted into said cell or organism. It shall also mean the formation of new combinations of genetic material by incorporation of a cell into a host cell, where they occur naturally (self cloning) as well as modification of an organism or in a cell by deletion and removal of parts of the heritable material;

(v) "microorganisms" shall include all the bacteria, viruses, fungi, mycoplasma, cell lines, algae, protodoans and nematotes indicated in the schedule and those that have not been presently know to exist in the country or not have been discovered so far.

4. COMPETENT AUTHORITIES

(1) **Recombinant DNA Advisory Committee (RDAC):** This committee shall review developments in Biotechnology at national and international levels and shall recommend suitable and appropriate safety regulations for India in recombinant research, use and applications from time to time. The Committee shall function in the Department of Biotechnology.

(2) **Review Committee on Genetic Manipulation (RCGM):** This committee shall function in the Department of Biotechnology to monitor the safety related aspects in respect of on-going research projects and activities involving genetically engineered organisms/hazardous microorganisms. The Review Committee on Genetic Manipulation shall include representatives of (a) Department of Biotechnology (b) Indian Council of Medical Research (c) Indian Council of Agricultural Research (d) Council of Scientific and Industrial Research (e) other experts in their individual capacity. Review Committee on Genetic Manipulation may appoint sub groups.

It shall bring out Manuals of guidelines specifying procedure for regulatory process with respect to activities involving genetically engineered organisms in research, use and applications including industry with a view to ensure environmental safety. All ongoing projects involving high risk category and controlled field experiments shall be reviewed to ensure that adequate precautions and containment conditions are followed as per the guidelines.

The Review Committee on Genetic Manipulation shall lay down procedures restricting or prohibiting production, sale, importation and use of such genetically engineered organism of cells as are mentioned in the Schedule.

(3) **Institutional Biosafety Committee (IBSC):** This committee shall be constituted by an occupier or any person including research institutions handling microorganism/genetically engineered organisms. The committee shall comprise the Head of the Institution, Scientists engaged in DNA work, a medical expert and a nominee of the Department of Biotechnology. The occupier or any person including research institutions handling microorganisms/genetically engineered organisms shall prepare, with the assistance of the Institutional Biosafety Committee (IBSC) an uptodate on site emergency plan according to the manuals/guidelines of the RCGM and make available copies to the District Level Committee/State Biotechnology Co-ordination Committee and the Genetic Engineering Approval Committee.

(1) Genetic Engineering Approval Committee (GEAC):

This committee shall function as a body under the Department of Environment, Forest and Wildlife for approval of activities involving large scale use of hazardous microorganisms and recombinants in research and industrial production from the environmental angle. The Committee shall also be responsible for approval of proposals relating to release of genetically engineered organisms and products into the environment including experimental field trials.

The composition of the Committee shall be

(i) Chairman-Additional Secretary, Department of Environment, Forests and Wild life Co-Chairman-Representative of Department of Bio-technology

(ii) Members: Representative of concerned Agencies and Departments, namely, Ministry of Industrial Development, Department of Biotechnology and the Department of Atomic Energy:

(iii) Expert members: Director General Indian Council of Agricultural Research, Director General-Indian Council of Medical Research, Director General-Council of Scientific and Industrial Research, Director General-Health Services, Plant Protection Adviser, Directorate of Plant Protection, Quarantine and storage, Chairman, Central Pollution Control Board and three outside experts in individual capacity.

(iv) Member Secretary: An official of the Department or Environment, Forest and Wild life.

The committee may co-opt other members/experts as necessary.

The committee or any person/s authorised by it shall have powers to take punitive action under the Environment (Protection) Act.

(4) **State Biotechnology Co-Ordination Committee (SBCC):** There shall be a State Biotechnology Coordination Committee in the States wherever necessary. It shall have powers to inspect, investigate and take punitive action in case or violations of statutory provisions through the Nodal Department and the State Pollution Control Board/Directorate of Health/Medical Services. The Committee shall review periodically the safety and control measures in the various industries/institutions handling genetically engineered Organisms/Hazardous microorganisms. The composition of the Coordination Committee shall be:

(i) Chief Secretary - Chairman
(ii) Secretary, Department of Environment - Member Secretary
(iii) Secretary, Department of Health - Member
(iv) Secretary, Department of Agriculture - Member
(v) Secretary, Department of Industries and Commerce - Member
(vi) Secretary, Department of Forests - Member
(vii) Secretary, Department of Public works/Chief Engineer, Department of Public Health Engineering - Member
(viii) State microbiologists and Pathologists - Member
(ix) Chairman of State Pollution Control Board

The Committee may co-opt other members/experts as necessary.

(5) **District Level Committee (DLC):** There shall be a District Level Biotechnology Committee (DLC) in the districts wherever necessary under the District Collectors to monitor the safety regulations in installations engaged in the use of genetically modified organisms/hazardous microorganisms and its applications in the environment.

The District Level Committee/or any other person/s authorised in this behalf shall visit the installation engaged in activity involving genetically engineered organisms, hazardous microorganisms, formulate information chart, find out hazards and risks associated with each of these installations and coordinate activities with a view to meeting any emergency. The District Level Committee shall regularly submit its report to the State Biotechnology Co-ordination Committee/Genetic Engineering Approval Committee.
The District level Committee shall comprise of:

(i) District Collector - Chairman
(ii) Factory Inspector - Member
(iii) A representative of the Pollution Control Board - Member
(iv) Chief Medical Officer (District Health Officer) – Member (Convenor)
(v) District Agricultural Officer - Member
(vi) A representative of the Public Health Engineering Department - Member
(vii) District Microbiologists pathologist (Technical expert) - Member
(viii) Commissioner Municipal Corporation - Member

The Committee may co-opt other member/s/experts as necessary.

5. CLASSIFICATION OF MICROORGANISMS OR GENETICALLY ENGINEERED PRODUCT

(i) For the purpose of these rules, microorganisms or genetically engineered organisms, products or cells shall be dealt with under two major heads; animal pathogens and plant pests and these shall be classified in the manner specified in the Schedule.

(ii) If any of the microorganism, genetically engineered organism or cell falls within the limits of more than one risk class as specified in the Schedule, it shall be deemed to belong exclusively to the last in number of such classes.

6. MICROORGANISMS LAID DOWN IN THE SCHEDULE ARE DIVIDED INTO THE FOLLOWING

(i) Bacterial agents:
(ii) Fungal Agents:
(iii) Parasitic Agents
(iv) Viral, Rickettsial and Chlamydial Agents:
(v) Special Category

7. APPROVAL AND PROHIBITIONS

(1) No person shall import, export, transport, manufacture, process, use or sell any hazardous microorganisms or genetically engineered organisms/substances or cells except with the approval of the Genetic Engineering Approval Committee.

(2) Use of pathogenic microorganism or any genetically engineered organisms or cell for the purpose of research shall only be allowed in laboratories or inside laboratory areas notified by the Ministry of Environment and Forests for this purpose under the Environment (Protection) Act, 1986.

(3) The Genetic Engineering Approval Committee shall give directions to the occupier to determine or take measures concerning the discharge of micro-organisms/genetically engineered organisms or cells mentioned in the schedule from the laboratories, hospitals and other areas including prohibition of such discharges and laying down measures to be taken to prevent such discharges.

(4) Any person operating or using genetically engineered organism microorganisms mentioned in the schedule for scale up or pilot operations shall have to obtain licence issued by the Genetic Engineering Approval Committee for any such activity. The possessor shall have to apply for licence in prescribed proforma.

(5) Certain experiments for the purpose of education within the field of gene technology or microorganism may be carried out outside the laboratories and laboratory areas mentioned in sub-rule (2) and will be looked after by the Institutional Biosafety Committee.

8. PRODUCTION

Production in which genetically engineered organisms or cells or micro-organism are generated or used shall not be commenced except with the consent of Genetic Engineering Approval Committee with respect of discharge of genetically engineered organisms or cells into the environment. This shall also apply to production taking place in connection with development, testing and experiments where such production, etc, is not subject to rule 7.

9. DELIBERATE OR UNINTENTIONAL RELEASE

(1) Deliberate or unintentional release of genetically engineered organisms/hazardous microorganisms or cells, including deliberate release for the purpose of experiment shall not be allowed.

Note: Deliberate release shall mean any intentional transfer of genetically engineered organisms/hazardous microorganisms or cells to the environment or nature, irrespective of the way in which it is done:

(2) The Genetic Engineering Approval Committee may in special cases give approval of deliberate release.

10. PERMISSION AND APPROVAL FOR CERTAIN SUBSTANCES

Substances and products, which contain genetically engineered organisms or cells or microorganisms shall not be produced, sold, imported or used except with the approval of genetic engineering approval committee.

11. PERMISSION AND APPROVAL FOR FOOD STUFFS

Food stuffs, ingredients in food stuffs and additives including processing aids containing or consisting of genetically engineered organisms or cells, shall not be produced, sold, imported or used except with the approval of the Genetic Engineering Approval Committee.

12. GUIDELINES

(1) Any person who applies for approval under rules 8-11 shall, as determined by the Genetic Engineering Approval Committee submit information and make examinations or cause examinations to be made to elucidate the case, including examinations according to specific directions and at specific laboratories. He shall also make available an on-site emergency plan to GEAC before obtaining the approval. If the authority makes examination itself, it may order the applicant to defray the expenses incurred by it in so doing.

(2) Any person to whom an approval has been granted under rules 8-11 above shall notify the Genetic Engineering Approval Committee of any change in or addition to the information already submitted.

13. GRANT OF APPROVAL

(1) In connection with the granting of approval under rules 8 to 11 above, terms and conditions shall be stipulated, including terms and conditions as to the control to be excercised by the applicant, supervision, restriction on use, the layout of the enterprise and as to the submission of information to the State Biotechnology Co-ordination Committee or to the District Level Committee

(2) All approvals of the Genetic Engineering Approval Committee shall be for a specified period not exceeding four years at the first instance renewable for 2 years at a time. The Genetic Engineering Approval Committee shall have powers to revoke such approval in the following situations:

(a) If there is any new information as to the harmful effects of the genetically engineered organisms or cells.

(b) If the genetically engineered organisms or cells cause such damage to the environment, nature or health as could not be envisaged when the approval was given, or

(c) Non compliance of any condition stipulated by Genetic Engineering Approval Committee.

14. SUPERVISION

(1) The Genetic Engineering Approval Committee may supervise the implementation of the terms and conditions laid down in connection with the approvals accorded by it.

(2) The Genetic Engineering Approval Committee may carryout this supervision through the State Biotechnology Coordination Committee or the State Pollution Control Boards/District Level Committee or through any person authorised in this behalf.

15. PENALTIES

(1) If an order is not complied with, the District Level Committee or State Biotechnology Co-ordination Committee may take measures at the expenses of the person who is responsible.

(2) In cases where immediate interventions is required in order to prevent any damage to the environment, nature or health, the District level Committee or State Biotechnology Coordination Committee may take the necessary steps without issuing any orders or notice. The expenses incurred for this purpose will be repayable by the person responsible for such damage.

(3) The State Biotechnology Co-ordination Committee /District Level Committee may take samples for a more detailed examination of organisms and cells.

(4) The State Biotechnology Co-ordination Committee/District Level Committee shall be competent to ask for assistance from any other Government authority to carry out its instructions.

16. RESPONSIBILITY TO NOTIFY INTERRUPTIONS OR ACCIDENTS

(1) Any person who under rule 7-11 is responsible for conditions or arrangements shall immediately notify the District Level Committee \State Biotechnology Co-ordination Committee and the state medical officer of any interruption of operations or accidents that may lead to discharges of genetically engineered organisms or cells which may be harmful to the environment, nature or health or involve any danger thereto.

(2) Any notice given under sub-rule (1) above shall not lessen the duty of the person who is responsible to try effectively to minimise or prevent the effects of interruptions of operations of accidents.

17. PREPARATION OF OFF-SITE EMERGENCY PLAN BY THE DLC

(1) It shall be the duty of the DLC to prepare an off-site emergency plan detailing how emergencies relating to a possible major accident at a site will be dealt with and in preparing the plan, the DLC shall consult the occupier and such other person as it may deem necessary.

(2) For the purpose of enabling the DLC to prepare the emergency plan required under sub-rule(I), the occupier shall provide the DLC with such information relating to the handling of hazardous microorganisms/genetically engineered organisms under his control as the DLC may require including the nature, extent and likely off-site affects of a possible major accident and the DLC shall provide the occupier with any information from the off-side emergency plan which relates to his duties under rule 16.

18. INSPECTIONS AND INFORMATIONS REGARDING FINANCE

(1) The State Biotechnology Co-ordination Committee or the Genetic Engineering Approval Committee/the DLC or any person with special knowledge duly authorised by the State Biotechnology Co-Ordination Committee or the Genetic Engineering Approval Committee or the DLC where it is deemed necessary, at any time on due production if identity be admitted to public as well as to private premises and localities for the purpose of carrying out supervision.

(2) Any person who is responsible for activities subject to rules 7-11 above shall at the request of District level Committee or State Biotechnology Coordination Committee or the GEAC submit all such information including information relating to financial conditions and accounts, as is essential to the authority's administration under these rules. He shall also allow supervision or inspection by the Authorities or persons indicated in sub-rule(I).

(3) The Genetic Engineering Approval Committee may fix fees to cover, in whole or in part, the expenses incurred by the authorities in connection with approvals, examinations, supervision and control.

19. APPEAL

(1) Any person aggrieved by a decision made by Genetic Engineering Approval Committee/State Biotechnology Co-ordination Committee in pursuance of these rules may within thirty days from the date on which the decision is communicated to him, prefer an appeal to such authority as may be appointed by Ministry of Environment and Forests provided that the appellate authority may entertain the appeal after the expiry of the said period of thirty days if such authority is satisfied that the appellant was prevented by sufficient cause from filing the appeal in time.

20. EXEMPTION

The Ministry of Environment and Forests shall, wherever necessary, exempt an occupier handling a particular microorganism/genetically engineered organism from rule 7-11.

A. ANIMAL AND HUMAN PATHOGENS

Schedule

BACTERIAL

Risk Group II

- Acinetobacter calcoacetieus
- Actinobacillus-all species except A mallei, which is in Risk Group III
- Aeromonoas hydrophila
- Arizona hinshawii-all serotypes
- Bacillus anthracis
- Bordetella all species
- Borrelia recurrentis.B.Vincenti
- Campylobacter fetus
- Camphylobacter jejuni, Chalamydia psittaci
- Cheamydia trachomatics
- Clostridium chauvoei, Cl.difficile Cl/fallax. Cl haemolyticum Q.histolyticum, CI novyi (CI,Pefringes) Cl.speticum, Cl.sordelli
- Corynebacterium diptheriae, C.equi, C. haemolyticum, C.Pseudotuberculosis, C.pyogenes, C.renale
- Diplococcus (Streptococcus) pneumoniae
- Edwardsiila tarda
- Erysipelothix insidiosa
- Escherichia Coli-all enteropathogenic serotypes, enterotoxigenic
- Haemophilus ducrevi, H.influenzae, H. pneumoniae
- Herellea vaginicola
- Klebsiella-all species and all serotypes
- Legionlla pneumophila
- Letionella
- Leptospira interrogans-all serotypes reported in India
- Listeria, all species
- Mima polymorpha
- Moraxella-all species
- Mycobacteria-all species including Mycobacterium avium
- M.Bovis M.tuberculosis, M.Leprae
- Mycoplasma-all species except M.Mycoides and M.angalactiae
- Meosseroc gonorrhoea,N. Leprae
- Mycoplasma-all species except M.Mycoides and M.angalactiae
- Neisseric gonorrhoea,N. meningitis
- Pasteurella-all species except those listed in Risk Group III
- Salmonella-all species and all setotypes
- Shigella-all species and all serotypes
- Sphaerophorgs necrophorus
- Staphylococcus aureus
- Streptobacillus moniliformis
- Streptococcus pneumoniae
- Streptococcus pyogenes.S.equi
- Streptomyces madurae,s.pelleteri, s.somaliensis
- Treponema carateum, T.pallidam and T.pettenue
- Vibrio foetus V.comma including biotype EI Top and
- V. parahemolyticus
- Vibrio cholerae

Risk Group III:

- Actinobacillus mallei
- Bartonella-all species
- Brucella-all species
- Clostridium botulium Cl.tetani

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- Francisella tularensis
- Mycobacterium avium,. M.bovis, M.tuberculosis,m.leprae
- Pasteurella multocida type B("buffalo" and other foreign virulent strains)
- Pseudomonas pseudomallai
- Yersinia pestis

FUNGAL

Risk Group II

- Actinomycetes (including Nocardia SP, Actinomyces species and Arachina propinica)
- Aspergillus fumigatus
- Blastomyces dermatitis
- Cryptococcus neoformans C. fersiminosos
- Epidermophyton madurella, microsporon
- Paracoccidiodes brasiliensis
- Sporothrix
- Trichoderma
- Trichophyton

Risk Group III

- Coccidioides immitis
- Histoplasma capulatum
- Histoplasma capsulatum var duboiss

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PARASITIC

Risk Group II

- Entahoeba histolytica
- Leishmania species
- Naegleria gruberia
- Plasmodium theilera, *P. babesia, P. falcoparum*
- Plasmodium babesia
- Schistosoma
- Toxoplasma gondii
- Toxocana canis
- Trichinella spiralis
- Trichomanas
- Trypanosoma cruzi

Risk Group III

- Schisistosoma mansoni

VIRAL RICKETTSIAL AND CHALMYDIAL

Risk Group II

- Adenoviruses - Human all types
- Avian loukosis
- Cache Valley virus
- CELO (avian adenovirus)
- Coxsackie A and B viruses
- Corona viruses
- Cytomegalo viruses
- Dengue virus, when used for transmission experiments
- Echo viruses - all types
- Encephalomyocarditis virus (EMC)

- Flanders virus
- Hart Part virus
- Hepatitis - associated antigen material - hepatitis A and B viruses, non A and non B, HDV
- Herpes viruses - except herpesviruses simiae (monkey B virus) which is in Risk Group IV.
- Infectious Bovine Rhinotraechitis virus (IBR)
- Infectious Bursal diseases of poultry and Infectious Bronchitus
- Infectious Laryngotraechitis (ILT)
- Influenza virus - all types, except A PR 834 which is in Risk Group I
- Langat virus Leucosis Complex
- Lymphogranuloma venereum agent
- Marek's Disease virus
- Measles virus
- Mumps virus
- Newcastle disease virus (other than licenced strain for vaccine use)
- Parainfluenza viruses - all type except parainfluenza virus 3, SF4 strain, which is in Risk Group I.
- Polio viruses - all types, wild and attenuated
- Poxviruses - all types except Alastrim, monkey pox, sheep pox and white pox, which depending on experiments are in Risk Group III or IV.
- Rabies virus - all strains except rabies stret virus, which should be classified in Risk Group III when inoculated into cornivores
- Reoviruses - all types
- Respiratory syncytial virus
- Rhinoviruses - all types
- Rinderpest (other than vaccine strain in use)
- Rubella virus
- Stimian viruses - all types except herpeavirus simlae (Monkey Virus) which is in Risk Group IV.
- Simian virus 40 -
- Ad 7 SV 40 (defective)
- Sindbis virus
- Tensaw virus
- Turlock virus
- Vaccinia virus
- Varicella virus
- Vole rickettsia
- Yellow fever virus, 17D vaccine strain

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Risk Group III

- African House Sickness (attenuated strain except animal passage)
- Alastrim, monkey pox and whitepox, when used in vitro
- Arboviruses - All strains except those in Risk Group II and IV.
- Blue tongue virus (only serotypes reported in India)
- Ebola fever virus
- Feline Leukemia Epstein-Barr virus
- Feline sarcoma
- Foot and Mouth Disease virus (all serotypes and sutbypes)
- Gibbon Ape Lymphosarcoma
- Herpesvirus ateles
- Herpesvirus saimiri
- Herpes simplex 2
- HIV-I & HIV-2 and strains of SIV
- Infectious Equine Anaemia
- Lymphocytic choriomeningitis virus (LCM)
- Monkey pox, when used in vitro
- Nen-defective Adeno-2 SV-40 hybrids
- Psittacosis-ornithosis-trachoma group of agents
- Pseudorabies virus
- Rabies street virus, when used inoculations of carnivores

- Rickettsia-all species except Vole rickettsia and Coxiell burnetti when used for vector transmission or animal inoculation experiments
- Sheep pox (field strain)
- Swine Fever virus
- Vesicular stomatitis virus
- Woolly monkey Fibrosarcoma
- Yaba pox virus

Risk Group IV

- Alastrim, monkeypox, whitepox, when used for transmission or animal inoculation experiments
- Hemorrhagic fever agents, including Crimean hemorrhagic fever (congo)
- Korean hemorrhagic fever and others as yet undefined
- Herpesvirus simlae (monkey B virus)
- Tick-borne encephalitis virus complex, including - Russian
- Spring Summer Encephalitis, Kyasanur Forest Diseast, omsk hemorrhagic fever and Central European encephalitis viruses.

SPECIAL CATEGORY

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BACTERIAL

- Contagious Equine Metritis (H. equigenitalis)
- Pestis petit de ruminantium

VIRAL RICKETTSIAL AND CHLAMYDIAL

- African Horse Sickness virus (serotypes not reported in India and challenge strains)
- African Swine Fever
- Bat rabies virus
- Blue tongue virus (serotypes not reported in India)
- Exoitic FMD virus types and sub-types
- Junin and Machupo viruses
- Lassa virus
- Marburg virus
- Murrey valley encephalitis virus
- Rift Valley Fever virus
- Smallpox virus - Archieval storage and propagation Swine Vesicular Disease
- Veneseulan equine encephalitis virus - epidemic strains
- Western Equine encephalitis virus Yellow fever virus - Wild strain
- Other Arboviruses causing epizootics and so far not recorded in India

B. PLANT PESTS

Any living stage (including active and dormant forms) of insects, mites nematodes, slugs, snails, bacteria, fungi, protozoa, other parsitic plants or reproductive parts thereof: viruses; or any organisms similar to or allied with any of the foregoing; or any infectious agents or substances, which can directly or indirectly injure or cause disease or damage in or to any plants or parts thereof, or any processed, manufactured, or other products of plants are considered plant pests.

Organisms belonging to all lower Taxa contained within the group listed are also included.

1. Viruses:

All viroids

All bacterial, fungal, algal, plant, insect and nematode viruses; special care should be take for:

(i) Geminiviruses,

(ii) Caulimoviruses,
(iii) Nuclear Polyhedrosis viruses,
(iv) Granulosis viruses, and
(v) Cytoplasmic polyhedrosis viruses.

2. Bacteria:

Family Pseudomonadaceae
- Genus Pseudomonas
- Genus Xanthomonas
- Genus Azotobacter

Family Rhizobiaceae
- Genus Rhizobium/Azorhizobium
- Genus Bradyrhizobium
- Genus Agrobacterium
- Genus Phyllobacterium
- Genus Erwinia
- Genus Enterobacter
- Genus Klebzieller

Family Spirollacea
- Genus Azospirillum
- Genus Acquspirillum
- Genus Oceonospirillum

Family Streptomycetaceae
- Genue Streptomyces
- Genue Nocardia

Family Actinomycetaceae
- Genue Actinomyces

Coryneform Group
- Genus Clavibacter
- Genus Arthrobacter
- Genus Curtobacterium
- Genus Bdellovibro

Family Rickettsiaceae
- Rickettsial-like organisms associated with insect diseases
- Gram-negative phloem-limited bacteria associated with plant diseases
- Gram-negative xylem-limited bacteria associated with plant diseases
- Cyanobacteria - All members of blue-green algae
- Mollicutes
- Family Spiroplasmataceae
- Mycoplama-like organisma associated with plant diseases
- Mycoplasma-like organisms associated with insect diseases

Algae
- Family Chlorophyceae
- Family Euglenophyceae
- Family Pyrophyceae
- Family Chrysophyceae
- Family Phaephyceae
- Family Rhodophyceae

Fungi
- Family Plasmodiophoraceae
- Family Chytridiaceae
- Family Olpidiopsidaceae
- Family Synchytriaceae

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Family Catenariaceae
Family Coelomomycetaceae
Family Saprolegniaceae
Family Zoopagaceae
Family Albuginaceae
Family Peronosporaceae
Family Pythiaceae
Family Mucoraceae
Family Choanephoraceae
Family Mortiercllaceae
Family Endogonaceae
Family Syncephalastraceae
Family Dimargaritaceae
Family Kickxellaceae
Family Saksenaeaceae
Family Entomophthoraceae
Family Ecerinaceae
Family Taphrinaceae
Family Endomycetaceae
Family Saceharomycetaceae
Family Eurotiaceae
Family Gymnoascaceae
Family Aseophaeriaceae
Family Onygenaceae
Family Microascaceae
Family Protomycetaceae
Family Elsinoeaceae
Family Myriangiaceae
Family Dothidiaceae
Family Chaetothyriaceae
Family Parmulariaceae
Family Phillipsiellaceae
Family Hysteriaceae
Family Pleosporaceae
Family Melamomataceae
Family Ophiostomataceae
Family Aseosphaeriaceae
Family Erysiphaceae
Family Meliolaceae
Family Xylariaceae
Family Diaporthaceae
Family Hypoereaceae
Family Clavicipataceae
Family Phacidiaceae
Family Ascocorticiaceae
Family Hemiphacidiaceae
Family Dermataceae
Family Sclerotiniaceae
Family Cyttariaceae
Family Helosiaceae
Family Sarcostomataceae
Family Sarcoscyphaceae
Family Auricolariaceae
Family Ceratobasidiaceae
Family Corticiaceae
Family Hymenochaetaceae
Family Echinodintiaceae
Family Eistuliniaceae
Family Clavariaceae
Family Polyporaceae
Family Tricholomattaceae
Family Ustilaginaceae

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Family Sporobolomycetaceae
Family Uredinaceae
Family Agaricaceae
Family Graphiolaceae
Family Pucciniaceae
Family Melampsoraceae
Family Gandodermataceae
Family Labonlbeniaceae
Family Sphaeropsidaceae
Family Melabconiaceae
Family Tubercularіaceae
Family Dematiaceae
Family Moniliaceae
Family Aganomucetaceae

Parasitic Weeds
Family Balanophoraceae-parasitic species
Family Cuscutaceae-parasitic species
Family Ttydonoraceae-parasitic species
Family Lauraceae-parasitic species Genus Cassytha
Family Lennoaceae-parasitic species
Family Loranthaceae-parasitic species
Family Myzodendraceae-parasitic species
Family Olacaceae-parasitic species
Family Orobanchaceae-parasitic species
Family Rafflesiaceae-parasitic species
Family Santalaceae-parasitic species
Family Scrophulariaceae-parasitic species

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Protozoa
Genus Phytomonas
And all protozoa associated with insect diseases.

Nematodes
Family Anguinidae
Family Belonolaimidae
Fmaily Caloosiidae
Family Criconematidae
Family Dolichodoridae
Family Fergusobiidae
Family Hemicycliophoridae
Family Heteroderidae
Family Hoplolaimidae
Family Meloidogynidae
Family Neotylenchidac
Family Nothotylenchidae
Family Paratylenchidae
Family Pratylenchidae
Family Tylenchidae
Family Tylenchulidae
Family Aphelenchoidiae
Family Longidoridae
Family Trichodoridae

Mollusca
Superfamily Planorbacea
Superfamily Achatinacea
Superfamily Arionacea
Superfamily Limacacea
Superfamily Helicacea
Superfamily Veronicellacea

Arthropoda

- Superfamily Ascoidea
- Superfamily Dermanyssoidea
- Superfamily Erjophyoidea
- Superfamily Tetranychoidea
- Superfamily Eupodoidea
- Superfamily Tydeoidea
- Superfamily Erythraenoidea
- Superfamily Trombidioidea
- Superfamily Hydryphantoidea
- Superfamily Tarasonemoidea
- Superfamily Pyemotoidea
- Superfamily Hemisarcoptoidea
- Superfamily Acaroidea
- Order Polydesmida
- Family Sminthoridae
- Family Forfieulidae
- Order Isoptera
- Order Thysanoptera
- Family Acrididea
- Family Gryllidae
- Family Gryllacrididae
- Faily Gryllotalpidae
- Family Phasmatidae
- Family Ronaleidae
- Family Tettigoniidae
- Family Tetragidae
- Family Thaumastocoridae
- Superfamily Piesmatoidea
- Superfamily Lygacoidea
- Superfamily Idiostoloidea
- Superfamily Careoidea
- Superfamily Pentatomoidea
- Superfamily Pyrrhocoroidea
- Superfamily Tingoidea
- Superfamily Miroidea
- Order Homoptera
- Family Anobiidae
- Family Apionidae
- Family Anthribidae
- Family Bostrichidae
- Family Brentidae
- Family Bruchidae
- Family Buprestodae
- Family Byturidae
- Family Cantharidae
- Family Carabidae
- Family Ceambycidae
- Family Chrysomelidae
- Family Coecinellidae
- Family Curculionidae
- Family Dermestidae
- Family Elalteridae
- Family Hydrophilidae
- Family Lyctidae
- Family Meloidae
- Family Mordellidae
- Family Platypodidae
- Family Scarabaeldae
- Family Scolytidae
- Family Selbytidae
- Order Lepidoptera

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Family Agromyzidae
Family Anthomiidae
Family Cecidomiidae
Family Chioropidae
Family Ephydridae
Family Lonchaeidae
Family Muscidae
Family Otitidae
Family Syrphidae
Family Tephritidae
Family Tipulidae
Family Apidae
Family Caphidae
Family Chalcidae
Family Cynipidae
Family Eurytomidae
Family Formicidae
Family Psilidae
Family Sircidae
Family Tenthredinidae
Family Torymidae
Family Xyloiopidae and

Also unclassifed organisms and/or organisms whose classification is unknown and all other organisms associated with plant and insect diseases.

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