IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

Plant Quarantine and its Measures in India

Manoj Kumar-
M.sc,M.Phil
Science Teacher J.N.V.Garhwa

Corresponding Author
Manoj Kumar

Keywords:

Quarantine, Diseases , Pests, Prevention, Treatment

ABSTRACT

The implementation of plant quarantine is an essential strategy to safeguard agricultural resources from the introduction and dissemination of detrimental pests and diseases. India, being a prominent agricultural country, has established stringent quarantine measures to protect its wide range of plant and animal species. This article presents a concise summary of the plant quarantine systems implemented in India. The main goal of these regulations is to deter the introduction of exotic pests and diseases that may present a substantial risk to Indian agriculture. This is accomplished by implementing a blend of inspection, processing, and certification protocols for imported plants, plant products, and other agricultural commodities.

INTRODUCTION

A mandate that places legal restrictions on the flow of agricultural products in order to keep plants, illnesses, or parasites out of a region and /or prevent or postpone their establishment. The process of plant quarantine involves separating plants until they are verified to be free from diseases and pests therefore ensuring their health Quarantine can denote either the physically designated quarantine station or the procedure of evaluating and refining the growing material. An established quarantine period of 40 days is required for separating the plant material.

Need of Plant Quarantine

Once introduced and established, a new pest can quickly grow to devastating proportions due to the lack of natural predators in the new habitat. Epidemics of plant pests have the potential to lead to the depletion of agricultural yield. Consequently, the primary objective is deterring the introduction of foreign pests into the country by implementing regulations that are necessary for ensuring

adherence (Dubey and Gupta, 2016). accordance with the International Plant Protection Convention (IPPC), 1951.

Plant Quarantine system in India

- In the early 20th century, the Indian Government mandated the fumigation of imported cotton bales in 1906 to avoid the entry of the Mexican cotton boll weevil (Anthonomus grandis), hence establishing an awareness of quarantine procedures in India.
- In 1946, the Directorate of Plant Protection, Quarantine and Storage was established under the responsibility of the Ministry of Food and Agriculture. In accordance with the DIP act, the Directorate of Plant Quarantine and Storage (DPPQS) in Faridabad has been created to enforce quarantine regulations and establish guidelines for quarantine inspection and disinfestations of any item for which a notification has been issued by the Central Government.
- The regulatory framework for plant quarantine in the country is established by the "Destructive Insects & Pests Act, 1914 (Act 2 of 1914)". The primary objective is to prohibit the entry of any insect, fungus, or other pest that has the potential to cause damage to crops. The scheme also provides for the phytosanitary certification of agricultural goods being exported in). accordance with the International Plant Protection Convention (IPPC), 1951.
- Under the PQ directive, the National Bureau of Plant Genetic Resources (NBPGR) in New Delhi, which serves as the central agency for exchanging plant genetic resources, has been given the authority to manage the quarantine processing of imported germplasm and transgenic planting material for research endeavours in the country (Kumar et al 2020).
- Not until 1984, when the Government of and Seeds (Regulation of Import into India) Order, 1984', was seed included in the DIP Act. This order became effective in June 1985 (Anonymous, 1985). To ensure that farmers have access to the highest quality planting materials globally, the Government of India introduced a 'New Policy on Seed Development' in September 1988. The new policy addresses the importation of seeds and planting materials for wheat, paddy, coarse cereals, oilseeds, pulses, vegetables, flowers, ornamentals, and fruit crops. It also stipulates the procedures and conditions for their importation and the associated plant quarantine measures.

Plant Quarantine is equipped into 3 divisions:

1. Domestic quarantine: Imposition of limitations on the transportation of plants and plant-related materials from one state to another. Transportation of some contaminated products to neighbouring states for commerce and export is strictly forbidden.

2. International quarantine: Legislative limitations on plant and plant-derived products vary among countries to guarantee the use of pest and disease-free materials.

3. Embargo: Imposition of an official prohibition on commerce or any other commercial activity with a specific country. Importation is forbidden when the pest danger is very high and the available safe protections in the country are insufficient.

Quarantine Regulations

Irrespective of the specific type of introduced plant, such as seeds, vegetables, fruits, etc., large-scale introductions are always precarious due to the challenging nature of comprehensive investigation and treatment (Dubey et al 2021). Given these criteria, plant quarantine governs the introductions in the following manner:

1. **Complete embargo/prohibition**: When the level of pest threat is very high, the existing measures in the country are insufficient and, as a result, the importation become forbidden.

2. **Post entry quarantine:** The risk is quite significant, but there are sufficient precautions in terms of post-entry isolation developing capabilities.

3.Restricted: Although the pest risk is low.an import permit is necessary to specify the requirements for entrance, inspection, and treatment.

4. Unrestricted: Import authorisation is unnecessary, and materials can enter unrestricted.

Inspection Procedures

- Visual inspection - To detect sclerotia, nematode galls, bunt galls, smuts, insect infestations, weed seeds, insect eggs, inert mater etc.
  X-ray test - Insect infestation
- Washing test - Spores of fungus eggs of insect adhering to seeds, nematode galls
- Sedimentation test Stem eelworm (Ditylenchus dipsaci) (Baerman Funnel Test)
- Incubation test Seed borne fungi/bacteria (Blotter/agar test)
- Grow out test - Seed borne Gacteria viruses downy mild Seed
- Electron microscopy - Potentially used for identification and characterization of all plant viruses.
- Serological methods: ELISA, DIBA, ISEM, Agglutination test, Nucleic acid hybridization, Reaction (PCR). Polymerized Chain

Plant Quarantine Treatments

1. Fumigation: Under atmospheric or under reduced pressure methyl bromide and other fumigants like HCN, phosphine and EDCT (ethylene dichloride + carbon tetrachloride mixture) are commonly used.

2. Heat treatment: Hot water treatment and hot air treatment are common methods employed in quarantine to eliminate insects, mites, nematodes, fungi, bacteria, and viruses. Against nematodes, flower buds should be treated at 44°C for 240 minutes; chrysanthemum should be treated at 48°C for 25 minutes; potato tubers should be treated at 45°C for 5 minutes; against insects and mites, strawberry runners should be treated at 46°C for 10 minutes.

3. Cold treatment: An atmospheric cold plasma jet can effectively sanitise plant leaves contaminated with fungus and regulate the transmission of infection.

4.Chemical treatment: The application of chemicals might occur in the form of dust. slurry, spray, or dip. The dosages of chemicals should be sufficient to eliminate the inoculums without causing death to the host.

5. Tissue culture: The tissue culture technique mitigates the potential of pest/pathogen invasion through two mechanisms: (i) The extent of infection is significantly reduced through the representation of introductions by meristem tips, resected buds, or embryos. ii) The aseptic plantlet system includes an integrated pest/pathogen detection capabilities.

Diseases/ pests introduced worldwide

- ❖ Late blight of potato (Phytophthora infestans) introduced from South America to Europe in 1830
- ❖ Golden nematode of potato (Globodera rostochinensis) introduced from Europe to USA in 1881
- ❖ Onion smut (Urocystis cepulae) introduced from France to Switzerland in 1924
- ❖ Bacterial canker of tomato (Clavibacter michiganensis) introduced from USA to UK in 1942

Diseases/ pests introduced in India

- ❖ Late blight of potato (Phytophthora infestans) introduced from England in 1883
- ❖ Downy mildew of cucurbits (Peronospora cubensis) introduced from Sri Lanka in 1918
- ❖ Black rot of crucifers (Xanthomonas cubensis) introduced from Java in 1929
- ❖ Wart of potato (Synchytrium endobioticum) introduced from Netherlands in 1953

Disease Controlled by Plant Quarantine

- ❖ Bunchy Top of Banana - Kerala
- ❖ Mosaic of Banana - Kerala
- ❖ Apple Scab- H. P.
- ❖ Wart of Potato - W. B (Zehra et al 2022)

International Plant Protection Convention (IPPC)

The **IPPC** is a multilateral legal agreement that promotes international collaboration in the field of plant protection. It was established in 1952. Corporate headquarters: Rome, Italy. 182 countries worldwide are members of this organisation. The system operates based on standards for pest risk analysis, criteria for establishing pest-free zones, and other guidelines which provide precise direction on subjects connected to the SPS Agreement.

Phytosanitary certificate

A phytosanitary certificate is a formal document officially issued by the Department of horticulture, agriculture, food, or water resources of the exporting country. Only a duly authorised officer from the National Plant Protection Agency (NPPO) is permitted to issue it. This agency is established to safeguard against the risk of transmitting pests,

contaminants, or diseases into the importing country. The issuance of the certificate must occur 14 days before the material is sent.

Quality control

Quality control refers to the systematic evaluation of the quality of all elements concerned in the production process by organisations.

There are 4 inspection stages in Quality control:

- ❖ Incoming quality control (IQC)
- ❖ In process quality control (IPQC)
- ❖ Final quality control (FQC)
- ❖ Outgoing quality control (OQC)

CONCLUSION

The plant quarantine serves as a crucial mechanism for eliminating pests and diseases from crops. Successful execution of quarantine procedures is strongly advised for the control of pests and diseases, thereby ensuring the preservation of crop productivity

REFERENCES

Dubey, S. C., & Gupta, K. (2016). Plant quarantine system for PGR in India. Indian Journal of Plant Genetic Resources, 29(03), 410-413.

Dubey, S. C., Gupta, K., Akhtar, J., Chalam, V. C., Singh, M. C., Khan, Z.,

Kumari, P. (2021). Plant quarantine for biosecurity during transboundary movement of plant genetic resources. Indian Phytopathology, 74(2), 495-508.

Kumar, K., Pandey, S. K., Verma, G., Kumar, P., & Kumar, S. (2020). History and objective of plant quarantine in India: A review. International Journal of Conservation Sciences, 8, 146-149.

Zehra, R. A. W. I. S. H., Moin, S. H. U. M. A.

I. L. A., Enamullah, S. M., & Ehteshamul-Haque, S. (2022). Detection and identification of quarantine bacteria and fungi associated with imported and local potato seed tubers. Pak. J. Bot, 54(3), 1157-1161.