

**Plant Quarantine
Guidelines and Procedures
for Germplasm Exchange
of
ICRISAT Mandate Crops**



Indian Council of Agricultural Research
New Delhi-110 001, India

**National Bureau of Plant Genetic
Resources**

Regional Station, Rajendranagar,
Hyderabad 500 030, Andhra Pradesh, India



ICRISAT

**International Crops Research Institute
for the Semi-Arid Tropics**

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Indian plant quarantine regulations are legislated under the Destructive Insects and Pests Act, 1914 and the Plant Quarantine Order 2003 for the purpose of prohibiting and regulating the import of agricultural articles into India.

The Plant Quarantine Laboratory (PQL) at ICRISAT, Patancheru, India caters to the plant quarantine requirements of the ICRISAT scientific community with respect to the germplasm exchange of ICRISAT's mandate crops: sorghum [*Sorghum bicolor* (L.) Moench], pearl millet [*Pennisetum glaucum* (L.) R. Br.], chickpea [*Cicer arietinum* (L.)], pigeonpea [*Cajanus cajan* (L.) Millspaugh], groundnut [*Arachis hypogaea* (L.)] and six small millets: finger millet [*Eleusine coracana* (L.) Gaertn.], foxtail millet [*Setaria italica* (L.) Beauv.], little millet (*Panicum sumatrense* Roth.ex Roem. & Schult.), barnyard millet [*Echinochloa crusgalli* (L.) Beauv.], proso millet [*Panicum miliaceum* (L.)] and kodo millet [*Paspalum scrobiculatum* (L.)]. Seed and plant material of these crops cannot be exported/imported directly by the institute's scientists. The National Bureau of Plant Genetic Resources (NBPGR) of the Indian Council of Agricultural Research (ICAR), New Delhi, is the plant quarantine authority responsible for ICRISAT's germplasm exchange. In 1985, NBPGR established a Regional Station at Rajendranagar, Hyderabad to implement the quarantine regulations in South India, to ensure safe movement of germplasm.

Export of Germplasm

The ICRISAT-PQL, in conjunction with NBPGR Regional Station, Hyderabad, conducts seed health tests on germplasm prior to export. The following export guidelines are to be followed before submitting seed material to PQL for export.

Guidelines

- Pre-export inspection of seed multiplication fields by NBPGR quarantine officials for seedborne diseases at various growth stages of the crop to avoid their spread.
- Collection of seed from fully mature and healthy plants.
- Cleaning seed to remove insects, pathogen propagules (smut sori, ergot sclerotia, and nematode cysts), weed seed, crop debris, soil

clods, stones, other foreign material, and small, shrunken, discolored and damaged seed.

- Submission of an on-line request for export of germplasm (form available at ICRISAT intranet under GT-Crop Improvement).
- Submission of untreated seed in fresh muslin bags or paper packets along with the four-point declaration certificate (available at PQL) for quarantine processing.
- Submission of the importing country's plant quarantine requirements, such as import permit, non-commercial value certificate, additional declaration for seed borne pathogens and pests, and any other specific regulations/requirements.

Procedure

Normally, 3 to 4 weeks (up to a maximum of 12 weeks) are needed to process each export germplasm request [other tests, such as the enzyme-linked immunosorbent assay (ELISA), grow-out test, agar test, and radiographic test, are carried out as and when necessary]. The protocol includes:

- **Phytosanitary clearance:** After receiving the export request from the consignor, PQL submits it to the NBPGR to obtain phytosanitary clearance.
- **Fumigation:** All seed samples received at PQL are subjected to either vacuum fumigation or atmospheric fumigation to kill storage pests. Vacuum fumigation (methyl bromide @ 32g m^{-3} for 4h) is used for sorghum, chickpea and pigeonpea, and atmospheric fumigation (aluminium phosphide @ 3g m^{-3} for 120 h) is used for groundnut and pearl millet.
- **Visual examination:** Each seed sample is checked and cleaned to eliminate storage pests, fungal fruiting bodies, sclerotia and nematode galls, and weed seed under illuminated magnifying lens (2X). X-ray radiography is used to detect any latent infestation of bruchids and chalcids in pulses, especially chickpea and pigeonpea.
- **Incubation tests:** After visual examination all seed samples are incubated using blotter test [International Seed Testing Association (ISTA)] to detect seedborne pathogens (fungi/bacteria/nematodes) on seed.
- **Microscopic examination:** All incubated samples are examined under stereo-binoculars for the presence of pathogens. Seed samples showing

poor germination and/or infection by pathogens (fungi, bacteria, and nematodes) of quarantine significance are rejected.

- **Voucher samples:** A small quantity of seed (depending upon sample size) is collected from each sample as a voucher specimen for submission to the Medium Term Module of NBPGR.
- **Inspection by NBPGR:** Quarantine scientists inspect the results of the visual examination and that of the incubation tests. Seed samples carrying pathogens of quarantine significance are detained.
- **Seed treatment:** All seed samples are treated with an appropriate mixture of a fungicide and an insecticide to keep the consignment free from pathogens and storage pests, unless requested otherwise by the importer.
- **Obligation of importing country quarantine regulations:** PQL ensures that every consignment has an import permit (where necessary) and adheres to any additional requirements, such as declaration for specific pests and a “no commercial value” certificate.
- **Phytosanitary Certificates (PCs):** NBPGR issues PCs for the approved samples. The infected samples are salvaged by appropriate chemical seed treatment.
- **Packaging and dispatch:** Each consignment is packed in a cardboard carton along with a letter addressed to the consignee by the Chief Plant Quarantine Officer of ICRISAT, an acknowledgement card, and a Material Transfer Agreement (MTA) form. The outside of each carton bears the MTA form for the FAO-designated germplasm accessions held in trust by ICRISAT, or for the ICRISAT-developed genetic material, as the case may be, to honor the intellectual property rights (IPR) regulation. Labels, such as “seed are treated with chemical”, “seed has no commercial value”, are affixed to the box along with the original PC and import permit in a separate yellow color envelope. The consignment must bear the seal of NBPGR on the face of the package before dispatch.

Import of Germplasm

Seed and plant material for research can only be imported into India after obtaining an Import Permit (IP). As per Schedule X of the Plant Quarantine Order, 2003, Director, NBPGR is empowered to issue import permits for all kinds of

import of plant germplasm for public/private sector institutions in the country. An IP is also required to import live insects, all fungi in pure cultures, soil, or clay for microbiological studies or physical and chemical analyses. For each of these items, authorities designated by the Government of India issue the import permit. The consignee should abide by the following import guidelines.

Guidelines

- Submission of on-line request for import (form available at ICRISAT intranet under GT-Crop Improvement) of seed/plant/plant products/ other material) to PQL.
- Submission of the import application by PQL to the relevant import-issuing authority (Table 1).

Table 1. Competent authorities to issue various import permits

Type of imports	Permit issuing authority
Seeds and plants for sowing/ planting Transgenics*/ Genetically Modified Organisms* (GMOs)/DNA*	Director, NBPGR, Pusa Campus, New Delhi 110 012.
Live insects/mites/ nematodes/microbial cultures/algae/bioagents/fungi in pure culture/ <i>Rhizobium</i> cultures/soil	Plant Protection Adviser to the Government of India, Directorate of Plant Protection Quarantine and Storage N.H. IV, Faridabad, Haryana 121 001

* After getting clearance from the Department of Biotechnology (DBT), Block 2, 7th floor, C.G.O. Complex, Lodi Road, New Delhi 110030

- PQL provides the import permit to the consignee along with mailing labels, guidelines, and an advance notice form for onward transfer to the consignor.
- *Import restrictions for groundnut: Groundnut can be imported only in the form of seed. Import of pods is not allowed. Vegetatively propagated wild *Arachis spp.* can be imported as healthy cuttings without root from plants grown in an intermediate quarantine facility in a non groundnut-growing country.*
- Advance notification of shipment by the consignor to the Director, NBPGR, New Delhi 110012, India with a copy to the Chief Plant Quarantine Officer, ICRISAT.
(The consignor should use green-mailing labels bearing the address "Director, NBPGR, New Delhi 110 012").

- *Accompanied baggage import: Seed and plant material brought as accompanied baggage also requires an IP and PC. The international airports located at New Delhi, Chennai, Mumbai, and Kolkata are the points of entry for seed/plant samples brought into India as accompanied baggage. In such cases the seed samples should be handed over to the staff of the Plant Quarantine and Fumigation stations at the airport.*

Procedure

The PQL liaises with NBPGR to release imported accessions.

- NBPGR conducts seed health tests (as indicated under export procedure), treats seed with fungicides according to mandatory ICAR guidelines, and releases for growing in the greenhouse or in the Post Entry Quarantine Isolation Area (PEQIA) at ICRISAT, as required. *In case of groundnut, five-week-old seedlings and not the seed, are released to PQL. (Entry into PEQIA fields at ICRISAT is restricted, and is coordinated with visits by NBPGR scientists. Experimentation and collection of plant samples during the crop growth in the PEQIA at ICRISAT is not allowed).*
- All plants grown in the greenhouse and PEQIA are kept under surveillance from the time of sowing until harvest, especially to detect and prohibit the introduction of exotic pests and pathogens. This ensures that only healthy first-generation seed are released from imported consignments.
- *After multiplication of imported material, depending on the availability and feasibility, the consignee should submit a small sample of germplasm (2000 seed for self-pollinated crops and 4000 seed for cross-pollinated crops) to the National Gene Bank, NBPGR, New Delhi 110012.*

For further information

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