

## Safety duplication of cultivated chickpea and wild relative genetic resources



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### When should it be used

When the original accessions are lost and no longer available and safety back-up storage is the only source for regenerating the accessions.

To replace active/base collections, when germination is very low or nil.

Should be located in a different country.

See also the general page on [safety duplication](#) procedures.

### Sample specifications

Following procedures in the Genebank Manual of ICRISAT (Upadhyaya and Laxmipathi, 2009).

#### Minimum sample size for storage

Cultivated species: 100 g of seeds.

Wild *Cicer* species: 200 seeds.

#### Viability for storage

Cultivated species: seeds with 85% viability or more.

Wild *Cicer* species: seeds with 80% viability or more.

#### Moisture content

5-7% ([FAO/IPGRI standards](#)).

### Container specifications

To ensure seed viability in the genebank and en route to the users.

#### Specifications of packaging material

Follow procedures of the ICRISAT Genebank Manual (Upadhyaya and Laxmipathi, 2009) and [FAO/IPGRI standards](#).

Use three-layered standard aluminum foil packets consisting of the following layers:

Polyester 17 g/m<sup>2</sup> (an outer layer of 17 g Melinex and 4 g lacquer).

Alufoil 33 g/m<sup>2</sup> [a middle layer of 33 g (12 mm) aluminum foil and 4 g lacquer].

Polyethylene 63 g/m<sup>2</sup> (an inner layer of 63 g polyethylene).

Use a packet size of 140x160 mm for holding an approximate seed quantity of 100 g.



Samples for safety duplication (photo: ICRISAT)

## Seed packaging method

Follow procedures of the ICRISAT Genebank Manual (Upadhyaya and Laxmipathi, 2009).

Prepare and label the aluminum foil packets with computer generated self-adhesive labels with the accession number, identity and season of harvest.

Take out only a few samples at the time from the drying room to minimize re-absorption of moisture by seeds.

Weigh the amount of seed prepared for storage and fill the container with seeds having at least 2.5 cm headspace for labeling.

Place a non-adhesive label with accession number, identity and season of harvest inside the packet.

Seal the container using a standard vacuum sealer.

Check for any deficiencies in packets and sealing.

Print the date of sealing on the packet and move the samples to the long-term store.

## Storage specifications

### Assigning location codes in boxes

Black-box storage based on the facilities of the centre holding the duplicate collection (e.g. in the case of ICRISAT, ICARDA seed storage location code practices).

Use a barcode system (Genebank Information Management System, GIMS).

### Storage conditions

Black-box storage at -18 to -22°C ([FAO/IPGRI standards](#)).

As per the [Svalbard Seed Deposit Guidelines](#).

### Shipping method

Should be safe, less costly and fast enough to avoid delays and deterioration of seed quality during transfer.

Preferably by air-freight to the nearest destination (following international shipment practices for perishable goods).



*Chickpea samples at the svalbard seed vault (photo: ICRISAT)*

## Legal arrangements

The Centre, host country and importing centre and country policies and practices for germplasm movement for black-box storage, must be fulfilled:

MOU for safety back-up.

Special [agreement for Svalbard](#).

Certificate of origin.

Certificate of no-commercial value.

GMO-free certificate.

Import permit.

Phytosanitary certificate.

Customs clearances.

Others.

See also the link to the [safety duplication strategies](#) on this site, for more details.

## Recording information during safety duplication

For large genebanks with active, base and safe duplication strategies, the following alternative is recommended (ICARDA Model):

- Flag of safety duplication status (Y/N).
- Number of seeds.
- Weight of seeds.
- Year of production of seeds.
- Year of safety duplication.
- Name of institute holding the safety duplicate(s).
- Box label where the sample is placed.
- Common steps (regardless of conservation strategy).

## References and further reading

FAO/IPGRI. 1994. Genebank standards. Food and Agriculture Organization of the United Nations, Rome and International Plant Genetic Resources Institute, Rome. Available in [English](#), [Spanish](#), [French](#) and [Arabic](#).

Nordgen. 2008. Agreement between (depositor) and the Royal Norwegian Ministry of Agriculture and Food concerning the deposit of seeds in the Svalbard Global Seed Vault. [online] The Svalbard Gloal Seed Vault, The Nordic Genetic Resource Centre, ALNARP. Available from: [http://www.nordgen.org/sqsv/scope/sqsv/files/SGSV\\_Deposit\\_Agreement.pdf](http://www.nordgen.org/sqsv/scope/sqsv/files/SGSV_Deposit_Agreement.pdf).

Upadhyaya HD, Laxmipathi Gowda CL. 2009. Managing and Enhancing the Use of Germplasm – Strategies and Methodologies. Technical Manual no. 10. Patancheru 502 324, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics. 236 pp.

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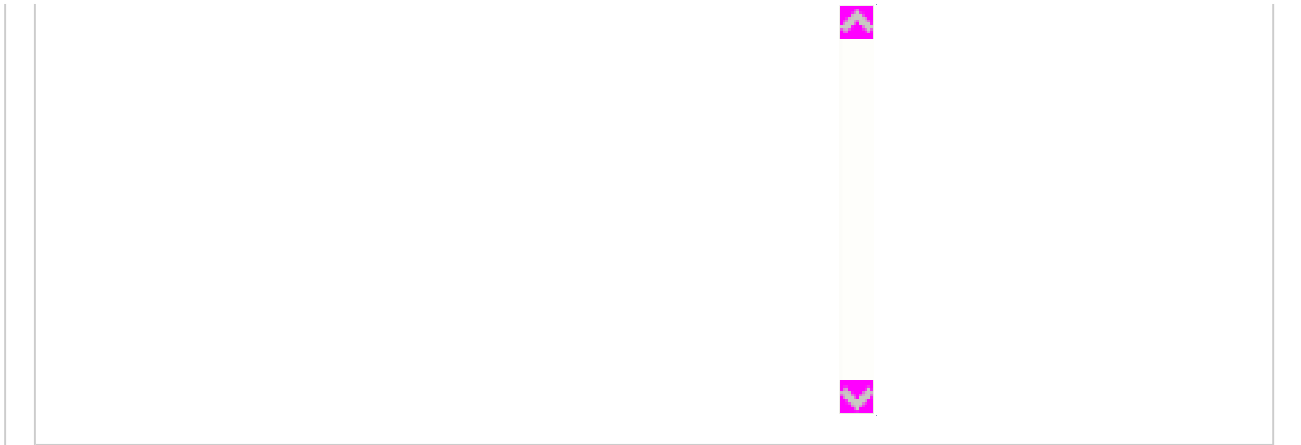
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