

CROP-SPECIFIC FIELD GENE BANK STANDARDS

Agreed by the *Allium* Working Group

May 2015

Note: the “FAO Field genebank standards” listed in the first column correspond to Chapter 5, pp. 65-113 in: FAO. 2014. Genebank Standards for Plant Genetic Resources for Food and Agriculture. Rev. ed. Rome. (www.fao.org/docrep/019/i3704e/i3704e.pdf)

FAO Field genebank standards	Crop-specific field genebank standards [vegetatively propagated <i>Allium</i> accessions, garlic, shallot, great-headed garlic, seed- producing species with low seed set] <i>No comment in this column means agreement with FAO standard</i>	Remarks (reasons for deviating from FAO standards)
5.1 Standards for choice of location of the field genebank		
5.1.1 The agro-ecological conditions (climate, elevation, soil, drainage) of the field genebank site should be as similar as possible to the environment where the collected plant materials were normally grown or collected.		
5.1.2 The site of the field genebank should be located so as to minimize risks from natural and manmade disasters and hazards such as pests, diseases, animal damage, floods, droughts, fires, snow and freeze damage, volcanoes, hails, thefts or vandals.		
5.1.3 For those species that are used to produce seeds for distribution, the site of the field genebank should be located so as, to minimize risks of gene flow and contamination from crops or wild populations of the same species to maintain genetic integrity.		
5.1.4 The site of the field genebank should have a secured land tenure and should be large enough to allow for future expansion of the collection.		
5.1.5 The site of the field genebank should be easily accessible to staff and supplies deliveries and have easy access to water, and adequate facilities for propagation and quarantine.		
5.2 Standards for acquisition of germplasm		
5.2.1 All germplasm accessions added to the genebank should be legally acquired, with relevant technical documentation.		

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5.2.2 All material should be accompanied by at least a minimum of associated data as detailed in the FAO/Bioversity multi-crop passport descriptors.		
5.2.3 Propagating material should be collected from healthy growing plants whenever possible, and at an adequate maturity stage to be suitable for propagation.		
5.2.4 The period between collecting, shipping and processing and then transferring to the field genebank should be as short as possible to prevent loss and deterioration of the material.		
5.2.5 Samples acquired from other countries or regions within the country should pass through the relevant quarantine process and meet the associated requirements before being incorporated into the field collection.		
5.3 Standards for establishment of field collections		
5.3.1 A sufficient number of plants should be maintained to capture the genetic diversity within the accession and to ensure the safety of the accession.	For clonal crops a number of 40-50 cloves / bulbs should be planted in plots for germplasm of higher priority (e.g. accessions included in core collections), Non-priority material should have 20 cloves / bulbs at minimum	
5.3.2 A field genebank should have a clear map showing the exact location of each accession in the plot.	The planting design needs to be clear, bulbs planted in rows with a distance allowing full expression of the plant features.	

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5.3.3 The appropriate cultivation practices should be followed taking into account micro-environment, planting time, rootstock, watering regime, pest, disease and weed control.	Depending on the region, winter hardiness needs to be considered. In colder climates, distinction between winter and spring types needs to be made, winter types being planted in autumn and harvested early or mid summer; spring types need to be planted when no further strong frost periods are being expected. Annual turnover or planting for several years need to be considered. This depends on the infection pressure in the given climate, which tends to be higher in the South and in humid conditions than in the North and under arid conditions. Rotation of cultivation plots with a 3-years period of soil free of vectors (i.e. free of any <i>Allium</i> species and/or putative other host species) needs to be planned to avoid nematodes. Keep virus-free material in isolation cages protected against entry of aphids.	
5.4 Standards for field management		
5.4.1 Plants and soil should be regularly monitored for pests and diseases.	Phytosanitation measures need to be taken in a timely manner. For this, the sanitary situation of the surrounding areas planted with <i>Alliums</i> pp. needs to be monitored as well as the crop in the field of the genebank. Possible decisions on preventive or curative measures for the planted collection have to be drawn in time.	

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5.4.2 Appropriate cultivation practices such as fertilization, irrigation, pruning, trellising, rootstock and weeding should be performed to ensure satisfactory plant growth.	Soil decontamination (solarization) should be done regularly in humid warm climates.	
5.4.3 The genetic identity of each accession should be monitored by ensuring proper isolation of accessions wherever appropriate, avoiding inter-growth of accessions, proper labelling and field maps and periodic assessment of identity using morphological or molecular techniques.		
5.5 Standards for regeneration and propagation		
5.5.1 Each accession in the field collection should be regenerated when the vigour and/or plant numbers have declined to critical levels in order to bring them to original levels and ensure the diversity and genetic integrity is maintained.		
5.5.2 True-to-type healthy plant material should be used for propagation.	Very valuable material should be cleaned of viruses by meristem culture or thermo-, chemo- or cryotherapy. These methods are time and labour consuming. Therefore, in emergency cases, securing the material should have priority over phytosanitation in order not to lose the germplasm. Results of virus indexing need to be assessed against the impact a given virus might have on germplasm management and distribution. As detection methods steadily improve and more and more viruses are detected it is important to concentrate on the really harmful viruses.	
5.5.3 Information regarding plant regeneration cycles and procedures including the date, authenticity of accessions, labels and location maps should be properly documented and included in the genebank information system.		

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5.5.4 For management purposes, the reproduction system of the plant material needs to be considered, whether it is a clonally maintained accession or an accession for seed propagated populations	In case seeds from vegetatively maintained accessions (concerns mainly shallot) are harvested and stored, they must be treated separately in a seed storage regime. It should be noted that typically this crop will not be isolated during regeneration and, thus being open-pollinated and not true to type with the mother clone.	
5.6 Standards for characterization		
5.6.1 All accessions should be characterized.		
5.6.2 For each accession, a representative number of plants should be used for characterization.		
5.6.3 Accessions should be characterized morphologically using internationally used descriptor lists where available. Molecular tools are also important to confirm accession identity and trueness to type.		
5.6.4 Characterization is based on recording formats as provided in internationally used descriptors.		
5.7 Standards for evaluation		
5.7.1 Evaluation data on field genebank accessions should be obtained for traits of interest and in accordance with internationally used descriptor lists where available.		
5.7.2 The methods/protocols, formats and measurements for evaluation should be properly documented with citations. Data storage standards should be used to guide data collection.		

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5.7.3 Evaluation trials should be replicated (in time and location) as appropriate and based on a sound statistical design.		
5.8 Standards for documentation		
5.8.1 Passport data for all accessions should be documented using the FAO/Bioversity multi-crop passport descriptors. In addition, accession information should also include inventory, map and plot location, regeneration, characterization, evaluation, orders, distribution data and user feedback.		
5.8.2 Field management processes and cultural practices should be recorded and documented.		
5.8.3 Data from 5.8.1. and 5.8.2 should be stored and changes updated in an appropriate database system and international data standards adopted.		
5.9 Standards for distribution		
5.9.1 All germplasm should be distributed in compliance with national laws and relevant international treaties and conventions		
5.9.2 All samples should be accompanied by all relevant documents required by the donor and the recipient country.		
5.9.3 Associated information should accompany any germplasm being distributed. The minimum information should include an itemized list, with accession identification, number and/or weights of samples, and key passport data.		
5.10 Standards for security and safety duplication		
5.10.1 A risk management strategy should be implemented and updated as required that addresses physical and biological risks identified in standards.		
5.10.2 A genebank should follow the local Occupational Safety and Health (OSH) requirements and protocols.		

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5.10.3 A genebank should employ the requisite staff to fulfil all routine responsibilities to ensure that the genebank can acquire, conserve and distribute germplasm according to the standards.		
5.10.4 Every field genebank accession should be safety duplicated at least in one more site and/or backed up by an alternative conservation method/strategy such as <i>in vitro</i> or cryopreservation where possible.		