Regeneration and Safety Duplication of Regionally Prioritized Crop Collections

2011 Technical and Financial Report

Section 1: Overall Project Information

Project Title: Regeneration and Safety Duplication of Regionally Prioritized Crop Collections: European Cooperative Programme for Plant Genetic Resources (ECPGR)			
Trust grant no: GS09011		**Project ref. no:** GSP09GAT1_1.2_10 GSP09GRD2_1.1_02	
Grant recipient: ECPGR C/O Bioversity International, Italy			**Country:** Italy
Project starting date: 1 March 2009		**Project end date:** 31 March 2011 **No-Cost Extension:** 31 December 2011	
Report type: 2011 Report	**Report Due Date:** 31 January 2012	**Period covered by this report:** 1 March 2009- 31 December 2011	

Project coordinator(s)[1]:

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[1] *Please amend if there have been changes to contact details given in the Grant Agreement*

This report is approved on behalf of ECPGR:

Signature

Dr. Emile Frison
Name

Director General
Position

18 april 2012
Date

I. Technical Report

We suggest that you get the crop-specific sections in Section 2 Collaborating Institutes information filled in first and then provide summary information from those reports here. The text should give an overall summary of the network's achievements form the start of the project to its end.

1. Summary of Achievements for the Network

Give an overview of the regeneration, characterization, in vitro culture and duplication activities undertaken by the network from the beginning of the project up to its end. You may paste in information from your last report, however, please do be sure to describe the achievements in 2011.

The project was carried out in collaboration with 11 partner institutions from 10 countries. One of the originally 12 partners foreseen, i.e. the Institute of Genetics and Cytology of the National Academy of Sciences of Belarus (IGC-NASB), eventually did not participate, due to difficulties to sign the Solemn Undertaking and to duplicate the material abroad. Wheat accessions of IGC-NASB (34) were therefore not planted for regeneration.
The actual number of regenerated accessions was 4138 out of a total of 5211 planned (79%).
Non viable accessions were 774, while 523 did not produce seed and 114 did not generate enough seed. An overall number of 338 accessions were planted in excess of the planned number.

The 774 accessions that were likely lost due to absence of viability were the following (see also attached excel sheet "Result of regenerated accessions – final"):

Grain legumes (153):

- Cowpea: 67 from Georgia
- Bean: 42 from Albania (37) and Azerbaijan (5)
- Faba bean: 39 from Georgia (26), Portugal (7), Albania (5) and Bulgaria (1)
- Lentil: 5 from Albania

Cereals (621):

- Wheat: 259 from Armenia (71) and Belarus (188)
- *Aegilops*: 205 from Armenia
- Barley: 146 from Armenia (17) and Belarus (129)
- Sorghum: 7 from Azerbaijan
- Maize: 4 from Bulgaria

Grain legumes. Out of the 1255 grain legume accessions that were expected to be regenerated in the project, 1091 (87%) were successfully regenerated. Specific crop percentages were: 100% (grasspea), 109% (chickpea), 91% (bean), 110% (lentil), 61% (faba bean) and 40% (cowpea).
The rate of successful regeneration was lower than expected in the case of faba bean (128 out of 210 or 61%), due to low percentages in Georgia-GSAU (21%), Portugal (52%) and Bulgaria (63%). The problem in Georgia was low germination ability of old seed (1999) and it was not possible to carry out an additional germination test of the same samples due to lack of seed. The problem in Portugal was different and linked to bad weather conditions for two consecutive years, (high temperature and low precipitation in 2009 and field flooding in 2010), causing a very poor harvest. In the case of Bulgaria, the problem was to find enough space to adequately isolate the accessions from each other and only a limited number could therefore be planted. The poor result of cowpea (40%) was mainly due to the complete lack of germination in Georgia, already reported in the previous years, since most of the accessions (old seed of 1993) did not germinate (4 out of 71 or 6%). Georgia-GSAU has regenerated additional chickpea and lentil accessions in 2011, bringing the total number above the original project total.

Cereals. Out of the 3956 cereal accessions that were expected to be regenerated by the project, 3047 (77%) were successfully regenerated. Specific crop percentages were: 117% (sorghum), 95.5% (maize), 96% (barley), 80% (wheat) and 16% (*Aegilops*). More accessions of sorghum than expected were regenerated since Bulgaria added 33 unplanned that were in store since more than 30 years. Regeneration of barley and wheat was generally very positive, with the exceptions of Armenia (41% barley and 10% wheat). The problem in Armenia was linked to poor performance of the plants, combined with bad (rainy) weather at harvest time.
Re-planting in 2011 was only partially successful since part of the wheat field was damaged by hail. Several accessions of wheat (71) and barley (17) remained not viable or did not produce any seed (98 wheat and 15 barley). In Belarus, unfavorable weather both in 2009 and in 2010 compromised the yield of a number of

barley and wheat accessions. Belarus increased the number of regenerated accessions by planting additional barley and wheat accessions in 2010 and 2011. Regeneration of *Aegilops* in Armenia has been problematic with poor germination, poor performance and unfavorable rainy weather. An additional planting in October 2010 of 457 accessions that had failed in previous years was severely compromised by rust disease in 2011 due to rainy spring and summer.

Specific achievements obtained in 2011 were the following:

Armenia: additional accessions were regenerated at no cost. The following accessions were planted in 2011: 46 barley (14 were regenerated and the 32 were not viable); 188 wheat (2 were regenerated, while the majority were not viable and others were damaged by hail); 457 *Aegilops* (49 were regenerated and the remaining were damaged by rust disease). All the regenerated accessions are ready for shipping for safety-duplication to Svalbard and to the CG centres.
Azerbaijan: additional accessions were regenerated at no cost (1 sorghum and 7 beans).
Belarus: additional accessions were regenerated, including breeding material of Belarusian origin: barley (129) and wheat (121). Accessions of wheat (33) were safety duplicated both at CIMMYT and at Svalbard.
Bulgaria: Additional accessions were regenerated: bean (7 out of 9 planted), faba bean (12), lentil (20), chickpea (40), cowpea (20), barley (30) and maize (46).
Georgia-GSAU: additional accessions of lentil (19) and chickpea (15) were regenerated.
Greece: 25 barley accessions have been safety-duplicated to Svalbard.
Israel: 300 accessions of barley that were regenerated in 2010 were duplicated to the NordGen on April 27th, 2011 and to Svalbard on 31 May 2011. 150 accessions of wheat that were regenerated in 2010 were duplicated to Svalbard on 31 May 2011 and to CIMMYT on 3 July 2011.

Pending activities:

Albania: A request was made of sending seed dried in ambient conditions and in paper bags, since the center does not have facilities for better processing. This request has been partially accepted by ICARDA, while no reply was received from CIAT and ICRISAT. It was also suggested that a duplicate is sent to Svalbard through the CG centres.
Armenia: Seed is ready but still needs to be shipped for safety duplication.
Azerbaijan: Seed still needs to be shipped for safety duplication.
Belarus: Barley (121) and wheat (129) accessions will be multiplied in order to obtain sufficient seed for safety duplication to CIMMYT, ICARDA and Svalbard. These accessions will also be characterized in 2012.
Safety duplication is planned in 2012 as follows: barley (March-April – 33 accessions, May-June - 108 accessions, November-December – 121 accessions); wheat (May-June – 108 accessions and November-December – 129 accessions).
Passport data are being prepared for upload onto EURISCO.
Bulgaria: Accessions not yet sent for safety duplication to: ICARDA (12+20+30); ICRISAT (30+122); CIMMYT (98+100+126); CIAT (43); IITA (20).
A total of 161 accessions have been sent to ICARDA in October 2011. However the receipt of these accessions at ICARDA was not confirmed so far, possibly due to the civil unrest. It might be considered to organize further shipment to ICARDA when the situation will be settled.
Georgia-GIF: Safety duplication of 70 sorghum accessions to ICRISAT is still pending.
Georgia-GSAU: Seed is ready but still needs to be shipped for safety duplication, pending resolution of unrest in Syria. Passport and characterization are in preparation.
Greece: safety duplication of barley to ICARDA has not been completed due to beaurocratic problems as well as to the unsettled local situation in Syria. Passport data are in preparation.
Hungary: All data are in preparation for on line access.
Portugal: Arrangements for safety duplication of 32 faba bean accessions to Spain and 12 to Svalbard are in progress.

Collection Holder Institute, Country	Crop	Total Number of Accessions Regenerated[1]		Total Number of Accessions Safety Duplicated[2]		
		Planned (original target)	Actual (from 1.2, section 2)	Genebank receiving safety duplicates	Actual (from 2.2, section 2)	Actual to Svalbard (seed only) (from 3.1, section 2)
ATTC-Lushnje, Albania	Bean	232	195	CIAT	0	0
	Faba bean	18	13	ICARDA	0	0
	Lentil	16	11	ICARDA	0	0
	Chickpea	6	6	ICRISAT	0	0
Armenian State Agrarian University, Armenia	Wheat	250	25	CIMMYT	0	0
	Barley	80	33	ICARDA	0	0
	Aegilops	750	117	ICARDA	0	0
Institute of Genetic Resources (National Academy of Sciences), Azerbaijan	Bean	78	73	CIAT	0	0
	Maize	200	200	CIMMYT	110	0
	Faba bean	14	14	ICARDA	0	0
	Grasspea	25	25	ICARDA	0	0
	Lentil	40	40	ICARDA	0	0
	Chickpea	65	65	ICRISAT	0	0
	Sorghum	15	11	ICRISAT	0	0
	Cowpea	20	20	IITA	20	0
Institute of Arable Farming and Plant Breeding, Belarus	Wheat	210	210	CIMMYT	33	33
	Barley	262	262	ICARDA	0	0
Institute of Plant Genetic Resources “K. Malkov”, Bulgaria	Bean	45	43	CIAT	0	0
	Maize	150	126	CIMMYT	0	0
	Bread Wheat	98	98	CIMMYT	0	0
	Durum Wheat	109	100	CIMMYT	0	0
	Barley	145	145	ICARDA	115	0
	Faba bean	60	38	ICARDA	26	0
	Grasspea	20	20	ICARDA	20	0
	Lentil	20	20	ICARDA	0	0
	Chickpea	30	30	ICRISAT	0	0
	Sorghum	89	122	ICRISAT	0	0
	Cowpea	20	20	IITA	0	0
Georgian Institute of Farming, Field Crops PGR, Georgia	Maize	100	100	CIMMYT	100	100
	Wheat	135	135	CIMMYT	135	135
	Sorghum	70	70	ICRISAT	0	70
Georgia State Agrarian University, Georgia	Faba bean	33	7	ICARDA	0	0
	Lentil	40	59	ICARDA	0	0
	Chickpea	46	61	ICRISAT	0	0
	Cowpea	71	4	IITA	0	0
National Agricultural Research Foundation, Greece	Barley	180	180	ICARDA	0	0
Research centre for Agrobotany, Hungary	Bean	139	139	CIAT	0	0
	Maize	89	89	CIMMYT	0	0
	Wheat	92	92	CIMMYT	0	0
	Barley	32	32	ICARDA	0	0
	Faba bean	25	25	ICARDA	0	0
	Grasspea	82	82	ICARDA	0	0
	Lentil	28	28	ICARDA	0	0
	Chickpea	22	22	ICRISAT	0	0
Institute for Cereal Crops Improvement, Israel	Wheat	300	300	CIMMYT	300	300
	Barley	600	600	NordGen	600	600
Instituto Nacional de Recursos Biologicos, Portugal	Faba bean	60	31	Spain (Centro de Recursos Fitogeneticos)	0	0

[1] *Number of accessions regenerated since start of project to now (in 2008, 2009, 2010,* ***2011****) with seed harvested, or in the case of vegetatively propagated crops, re-established in the field and/or successfully introduced* in vitro.

[2] *Number of accessions duplicated since start of project to now (in 2008, 2009, 2010, **2011)** to the genebank you nominated to receive the duplicates as specified in your Grant Agreement (also indicated in Section 2 of this template) and in the case of seed, also to the Svalbard Global Seed Vault.*

2. Planned activities not completed

Describe what activities have not been completed and give the reasons.

Armenia: Regeneration of 633 *Aegilops*, 225 wheat and 47 barley accessions in Armenia was not completed. The activity has been problematic with poor germination, poor performance and unfavorable rainy weather in 2009 and 2010. Also the *Aegilops* field planted in 2011 was severely compromised by rust disease (49 regenerated out of 457) due to rainy spring and summer. Part of the wheat field was also damaged by hail in 2011.
Bulgaria: it was not possible to regenerate all the expected faba beans (20 were not planted) due to lack of isolation space or to regenerate all the maize accessions (20 were not planted) due to limited funds.
Portugal: Bad weather conditions compromised the harvest of 23 faba bean accessions.

3. Other comments

Please give any other feedback you would like to provide on the project, technical and administrative.

n.a.

4. Passport and characterization data

Please provide passport and characterization data on accessions regenerated or indicate where this data can be found electronically.

Albania: Passport data are attached. Passport data are also included in EURISCO.
Armenia: Passport and characterization data are attached. Passport data are also included in EURISCO.
Azerbaijan: Passport and characterization data are attached. Passport data are also included in EURISCO.
Belarus: Passport and characterization data of 33 wheat and 33 barley accessions are attached. Remaining passport and characterization data will have to be provided.
Bulgaria: Passport data are included in EURISCO. Passport information in MCPD (EURISCO-format) will also be sent to the safety duplication centres in Excel files. Characterization and evaluation are also available in the attached Excel files.
Georgia-GIF: Data were sent to Svalbard and CIMMYT. Characterization data are enclosed to this report.
Georgia-GSAU: Electronic version of passport and characterization data is in preparation.
Greece: Characterization data are annexed. Passport data have been requested and are in preparation
Hungary: All data are in preparation for on line access. In the meantime, they are available upon request.
Israel: Passport data are available on the ICCI's website:
(http://www.tau.ac.il/lifesci/units/ICCI//genebank1.html) and on Svalbard' web site:
(http://www.nordgen.org/sgsv/data/index.php?app=dataset&inc=validation&dataset_id=19&PHPSESSID=jnnqhst31pkhpdoq1q4a9lj231).
Portugal: Passport data are available from EURISCO. Characterization data were used to prepare the poster "Regeneration and Safety Duplication of a Faba Bean Prioritized collection" that was presented at the Symposium "Genetic Resources at the 28th International Horticultural Congress which took place in Lisbon, in August 2010, (http://www.ihc2010.org/docs/S12.Book%20of%20Abstracts.pdf).
At present a scientific article on "Portuguese faba bean genetic resources" is in preparation for submission to a plant genetic resources journal. The characterization data are part of the results. As soon as the article will be published, the characterization data will be uploaded on the INRB web page (www. inrb.pt).

5. Photographs

Please supply photographs documenting the work carried out, preferably in digital format.

New pictures were provided by:
Armenia, Greece and Israel