

Status report on plant genetic resources of grain legumes in Germany, 2007

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The most important grain legumes collection in Germany is conserved by the Federal *ex situ* Genebank for Agricultural and Horticultural Plants of the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK) in Gatersleben.

After reunification of East and West Germany the collections in the major genebank at the Federal Centre for Breeding Research on Cultivated Plants (BAZ) in Braunschweig and the IPK had been reorganised. Therefore, the collection of the BAZ genebank (45,000 accessions) had been integrated into the collection of the IPK in 2003.

With a total of 148,000 accessions from more than 3,000 plant species, the IPK-Genebank holds one of the most comprehensive collections world-wide. Additionally grain legumes are maintained in Botanical Gardens and in working collections of research institutes and breeders.

In a cooperative project between the BAZ in Groß Lüsewitz and a private breeding company PGRs are used to improve the anthracnose resistance in narrow-leaved lupins (*Lupinus angustifolius* L.). On the basis of the novel resistances mapping populations are currently developed for linkage analysis relative to anthracnose resistance. For a more systematic molecular characterization of genetic diversity of lupin the establishment of TILLING populations may be a useful goal.

While the collection of the IPK is very well documented through the IPK Genebank Information System (GBIS) as well as through the National Inventory (PGRDEU – Plant Genetic Resources in Germany) there is at the moment less information available on what is sustainable conserved in other collections in Germany.

Table 1 summarises the content of the grain legumes collection of the IPK-Genebank and the biological status of accessions for the main grain legumes genera is shown in Table 2 (PGRDEU 2007, www.genres.de/pgrdeu). Furthermore, the percentage of regeneration of the *ex situ* legumes collection of the IPK-Genebank in 2006 is given in Table 3.

Table 1: Grain legumes accessions in the IPK-Genebank, 2007

Species	No. of accessions
Arachis sp.	6
Cajanus cajan (L.) Huth	8
Cajanus sp.	6
Cicer arietinum L.	367
Cicer flexuosum Lipsky	1
Cicer pinnatifidum Jaub. et Spach	3
Cicer songaricum Stephan ex DC.	1
Cicer sp.	161

Glycine max (L.) Merr.	1.660
Glycine soja Sieb. et Zucc.	30
Glycine sp.	1.282
Lablab purpureus (L.) Sweet	27
Lathyrus amphicarpos L.	2
Lathyrus angulatus L.	2
Lathyrus annuus L.	4
Lathyrus aphaca L.	11
Lathyrus articulatus L.	9
Lathyrus aureus (Steven) D. Brândza	2
Lathyrus cicera L.	66
Lathyrus cirrhosus Sér.	1
Lathyrus clymenum L.	21
Lathyrus davidii Hance	4
Lathyrus digitatus (M. Bieb.) Fiori	1
Lathyrus gorgoni Parl.	2
Lathyrus hierosolymitanus Boiss.	1
Lathyrus hirsutus L.	8
Lathyrus inconspicuus L.	2
Lathyrus komarovii Ohwi	1
Lathyrus latifolius L.	7
Lathyrus laxiflorus (Desf.) Kuntze	1
Lathyrus miniatus M. Bieb.	2
Lathyrus neurolobus Boiss. et Heldr.	2
Lathyrus niger (L.) Bernh.	1
Lathyrus nissolia L.	2
Lathyrus ochrus (L.) DC.	48
Lathyrus odoratus L.	4
Lathyrus pannonicus (Jacq.) Garcke	1
Lathyrus paranensis Burkart	1
Lathyrus pratensis L.	3
Lathyrus pseudocicera Pamp.	1
Lathyrus rotundifolius Willd.	1
Lathyrus sativus L.	256
Lathyrus sp.	38
Lathyrus sphaericus Retz.	1
Lathyrus sylvestris L.	9
Lathyrus tingitanus L.	10
Lathyrus tuberosus L.	4
Lathyrus vernus (L.) Bernh.	2
Lens culinaris Medik.	366
Lens ervoides (Brign.) Grande	4

<i>Lens nigricans</i> (M. Bieb.) Godr.	6
<i>Lens orientalis</i> (Boiss.) Popov	1
<i>Lens</i> sp.	85
<i>Lupinus albus</i> L.	231
<i>Lupinus angustifolius</i> L.	268
<i>Lupinus arboreus</i> Sims	3
<i>Lupinus atlanticus</i> Gladstones	3
<i>Lupinus benthamii</i> A. Heller	1
<i>Lupinus bicolor</i> Lindl.	1
<i>Lupinus cosentinii</i> Guss.	12
<i>Lupinus densiflorus</i> Benth.	2
<i>Lupinus formosus</i> Greene	1
<i>Lupinus hirsutissimus</i> Benth.	1
<i>Lupinus hispanicus</i> Boiss. et Reut.	49
<i>Lupinus leucophyllus</i> Douglas ex Lindl.	1
<i>Lupinus luteus</i> L.	129
<i>Lupinus mexicanus</i> Cerv. ex Lag.	5
<i>Lupinus micranthus</i> Guss.	20
<i>Lupinus mutabilis</i> Sweet	27
<i>Lupinus nanus</i> Douglas ex Benth.	3
<i>Lupinus nootkatensis</i> Donn ex Sims	2
<i>Lupinus palaestinus</i> Boiss.	1
<i>Lupinus perennis</i> L.	1
<i>Lupinus pilosus</i> L.	14
<i>Lupinus polycarpus</i> Greene	1
<i>Lupinus polyphyllus</i> Lindl.	26
<i>Lupinus pubescens</i> Benth.	15
<i>Lupinus rivularis</i> Douglas ex Lindl.	1
<i>Lupinus</i> sp.	1.627
<i>Lupinus subcarnosus</i> Hook.	7
<i>Lupinus subvexus</i> C. P. Sm.	1
<i>Lupinus succulentus</i> Dougl. ex K. Koch	10
<i>Lupinus truncatus</i> Nutt. et Arn.	1
<i>Lupinus variicolor</i> Steud.	1
<i>Phaseolus acutifolius</i> A. Gray	23
<i>Phaseolus coccineus</i> L.	436
<i>Phaseolus dumosus</i> Macfad.	1
<i>Phaseolus filiformis</i> Benth.	1
<i>Phaseolus lunatus</i> L.	39
<i>Phaseolus</i> sp.	435
<i>Phaseolus vulgaris</i> L.	7.741
<i>Pisum fulvum</i> Sibth. et Sm.	11

<i>Pisum sativum</i> L.	3.375
<i>Pisum</i> sp.	2.114
<i>Pisum syriacum</i> (Berger) Lehm.	3
<i>Vicia altissima</i> Desf.	1
<i>Vicia americana</i> Muhl. ex Willd.	1
<i>Vicia amoena</i> Fisch.	3
<i>Vicia amphicarpa</i> Dorthes	5
<i>Vicia amurensis</i> Oett.	5
<i>Vicia anatolica</i> Turrill	1
<i>Vicia angustifolia</i> L.	156
<i>Vicia articulata</i> Hornem.	16
<i>Vicia benghalensis</i> L.	10
<i>Vicia biennis</i> L.	3
<i>Vicia bithynica</i> L.	13
<i>Vicia cassia</i> Boiss.	1
<i>Vicia cassubica</i> L.	5
<i>Vicia cirrhosa</i> C. Sm. ex Webb. et Berth.	1
<i>Vicia cordata</i> Wulfen ex Hoppe	68
<i>Vicia costata</i> Ledeb.	2
<i>Vicia cracca</i> L.	17
<i>Vicia cretica</i> Boiss. et Heldr.	1
<i>Vicia dalmatica</i> Kern.	2
<i>Vicia dasycarpa</i> Ten.	2
<i>Vicia disperma</i> DC.	2
<i>Vicia dumetorum</i> L.	3
<i>Vicia elegans</i> Guss.	2
<i>Vicia epetiolaris</i> Burkart	2
<i>Vicia ervilia</i> (L.) Willd.	140
<i>Vicia faba</i> L.	1.920
<i>Vicia galilaea</i> Plitman et Zohary	5
<i>Vicia glauca</i> C. Presl.	1
<i>Vicia graminea</i> Sm.	1
<i>Vicia grandiflora</i> Scop.	6
<i>Vicia hirsuta</i> (L.) Gray	14
<i>Vicia hybrida</i> L.	4
<i>Vicia hyrcanica</i> Fisch. et C. A. Mey.	1
<i>Vicia incana</i> Gouan	1
<i>Vicia incisaeformis</i> Stef.	2
<i>Vicia johannis</i> Tamamsch.	76
<i>Vicia lathyroides</i> L.	6
<i>Vicia lilacina</i> Ledeb.	1
<i>Vicia ludoviciana</i> Nutt.	2

<i>Vicia lutea</i> L.	6
<i>Vicia macrocarpa</i> (Moris) Bertol.	36
<i>Vicia megalotropis</i> Ledeb.	4
<i>Vicia melanops</i> Sibth. et Sm.	2
<i>Vicia meyeri</i> Boiss.	2
<i>Vicia michauxii</i> Spreng.	5
<i>Vicia monantha</i> Retz.	10
<i>Vicia nana</i> Vogel	1
<i>Vicia narbonensis</i> L.	78
<i>Vicia nigricans</i> Hook. et Arn.	4
<i>Vicia ochroleuca</i> Ten.	2
<i>Vicia onobrychioides</i> L.	3
<i>Vicia orobus</i> DC.	3
<i>Vicia palaestina</i> Boiss.	3
<i>Vicia pannonica</i> Crantz	37
<i>Vicia parviflora</i> Cav.	3
<i>Vicia peregrina</i> L.	9
<i>Vicia pilosa</i> M. Bieb.	1
<i>Vicia pisiformis</i> L.	2
<i>Vicia pseudo-orobus</i> Fisch. et C. A. Mey.	4
<i>Vicia pubescens</i> (DC.) Link	2
<i>Vicia pyrenaica</i> Pourr.	5
<i>Vicia sativa</i> L.	721
<i>Vicia scandens</i> R. P. Murray	1
<i>Vicia semiglabra</i> Rupr. ex Boiss.	2
<i>Vicia sepium</i> L.	7
<i>Vicia serratifolia</i> Jacq.	18
<i>Vicia</i> sp.	1.558
<i>Vicia sylvatica</i> L.	2
<i>Vicia tenuifolia</i> Roth	10
<i>Vicia tetrasperma</i> (L.) Schreb.	7
<i>Vicia unijuga</i> A. Braun	4
<i>Vicia venosa</i> (Willd. ex Link) Maxim.	1
<i>Vicia vicioides</i> (Desf.) Cout.	1
<i>Vicia villosa</i> Roth	115
<i>Vigna aconitifolia</i> (Jacq.) Maréchal	2
<i>Vigna angularis</i> (Willd.) Ohwi et H. Ohashi	88
<i>Vigna caracalla</i> (L.) Verdc.	1
<i>Vigna mungo</i> (L.) Hepper	5
<i>Vigna nakashimae</i> (Ohwi) Ohwi et H. Ohashi	1
<i>Vigna radiata</i> (L.) R. Wilczek	110
<i>Vigna</i> sp.	46

Vigna umbellata (Thunb.) Ohwi et H. Ohashi	13
Vigna unguiculata (L.) Walp.	289
Total	26.915

Table 2: Biological status of accessions for the main grain legumes genera in the IPK-Genebank, 2007

Genus	Total no. of accessions	Percentage			
		wild/weedy	Traditional cultivar/landrace	Breeding / research material	Advanced /improved cultivar
<i>Phaseolus</i>	8.676	1	66	4	28
<i>Pisum</i>	5.503	1	33	6	55
<i>Vicia</i>	5.171	3	50	21	13
<i>Glycine</i>	2.972	1	20	58	21
<i>Lupinus</i>	2.465	17	48	9	15

Table 3: Regeneration of the *ex situ* legumes collection of the IPK-Genebank in 2006

	Legumes total	<i>Phaseolus</i>	Field Beans	Soybeans	Other Beans	Pea	Chickpea	<i>Lathyrus</i>	Vetches	Lupines	Lentils	Clover
% of regeneration / cultivation 2006	4.9	2.4	1.3	6.0	8.9	7.0	17.3	9.4	6.8	1.3	5.6	12.2