

USDA SOYBEAN GERMPLASM COLLECTION REPORT -- 2005

February 2006

In 2005, we distributed 26,942 seed lots from 8,934 accessions from the USDA Soybean Germplasm Collection in response to 502 requests from 236 individuals. Just over half of the packets (13,531) were requested for rust research. There were 451 domestic requests (90% of the total) with a total of 24,963 seed packets representing 8,041 accessions sent to 199 researchers from 39 states. Domestically, public scientists made 333 requests and scientists with commercial companies made 118 requests. There were 1,979 seed packets of 1,779 accessions in 51 orders sent to 37 scientists in 12 countries. Eighteen seed requests were made for 532 seed packets of 358 perennial *Glycine* accessions. We also sent seeds of 764 accessions to the National Center for Genetic Resources Preservation for backup.

We planted 1,883 plots of *G. max* for seed replacement in the Collection. These plots were planted at three locations: 1,320 four-row plots at Urbana, 372 four-row plots at Stoneville, and 191 two-row plots in Costa Rica. Plots for pure lining new accessions were planted in Urbana, Stoneville, and Costa Rica. Approximately 48 new pure line accessions from Brazil, China, Japan, and Vietnam were added to the Collection. Phytosanitary inspections of some of the field plots were conducted by Illinois Crop Improvement Association. This may be done on a routine basis in the future since many countries require this for importation of soybean seed.

After comparing the VIR soybean database with the USDA soybean germplasm collection, we requested and received seeds of 62 *G. max* and 40 *G. soja* from the Russian Federation. The *G. max* originated from the following countries: Burundi, 4; Colombia, 2; Former Soviet Union, 2; Ghana, 1; Moldova, 6; North Korea, 3; Philippines, 7; Russian Federation, 31; Seychelles, 2; Ukraine, 2; Uzbekistan, 1; and Vietnam, 1. We also received seeds of 21 *G. max* plant introductions from South Korea, 32 *G. max* from Taiwan, 5 domestic cultivars, and 16 germplasm releases.

All accessions added to the Collection prior to 2000 have been grown in evaluation trials. The USDA technical bulletin No. 1914 "Evaluation of the USDA Soybean Germplasm Collection: Maturity Groups 000 – IV (PI 507670 – PI 574486)" containing agronomic and descriptive data for 1,219 accessions has been published. With the exception of accessions in maturity groups IX and X which need further testing, the remaining evaluations should be ready for publication within the next year. A total of 15,980 accessions out of the total 17,564 plant introductions, cultivars, and private varieties in the collection has been summarized to date and the data added to the National Plant Germplasm GRIN database.

Several disease and insect screening results have been conducted on the collection and the data that has been received are summarized in the table below.

Marcelo Oliveira, a graduate student from Brazil, is working with us to develop a core collection for *G. max* for his Ph.D. research. He has completed the initial plans and developed the algorithms that will be used to select the core. We are able to use both the quantitative and qualitative data to develop genetic distance measurements among nearly all of the introduced *G. max* accessions in the collection. We expect that the core collection will be completed this year.

We are still waiting for the approval of material transfer agreements with AVRDC in Taiwan and with the Chinese Ministry of Agriculture that will allow us to satisfy the requirements of the USDA-ARS.

Working with the Director General of Vietnam Agricultural Science Institute, we have identified a new lead scientist to collect additional primitive soybean varieties for northern Vietnam with funds provided by the Plant Exchange Office. We are still waiting for the signed agreement from Hanoi. The agreement is in place with Mr. Truong Trong Ngon of Can Tho University for a similar project to collect soybean germplasm in central and southern Vietnam. Mr. Ngon is currently working on a Ph.D. degree in South Korea but is planning on returning this year.

A germplasm collection proposal that we submitted in collaboration with Dr. Gyuhwa Chung, Chonnam National University, S. Korea was funded by USDA-ARS to collect soybean and wild soybean on 30 of the 1620 islands in Jeollanam-do in far southern South Korea. This year before any funding was received Dr. Chung's students collected 278 soybean accessions and 103 wild soybean accessions from 12 islands and 8 peninsular regions. We currently have only 351 wild soybean accessions for South Korea. We anticipate that collecting will continue through 2007.

Greenhouse construction of new ARS greenhouse on the University of Illinois campus has been completed. The new facility will allow us to shorten photoperiod with black-out curtains as well as lengthen photoperiod with lights.

We hired a new full time germplasm assistant, Todd Bedford, to replace Josephine Weatherspoon, who retired in May, 2005.

As of December 31, 2005, the Collection contained the following entries:

USDA Soybean Germplasm Collection Inventory

Annual subcollection	Entries	Perennial species	Entries	Core
Introduced <i>G. max</i>	16787	<i>G. arenaria</i>	3	3
<i>G. soja</i>	1116	<i>G. argyrea</i>	12	3
Germplasm releases	181	<i>G. canescens</i>	119	20
Modern cultivars	509	<i>G. clandestina</i>	83	16
Old cultivars	208	<i>G. curvata</i>	6	4
Private cultivars	60	<i>G. cyrtoloba</i>	44	5
All isolines	640	<i>G. falcata</i>	25	5
Genetic types	195	<i>G. latifolia</i>	43	8
Annual sub-total	19696	<i>G. latrobeana</i>	7	6
		<i>G. microphylla</i>	32	9
		<i>G. pescadrensis</i>	71	2
		<i>G. pindanica</i>	1	0
		<i>G. rubiginosa</i>	33	2
		<i>G. stenophita</i>	25	0
		<i>G. tabacina</i>	137	13
		<i>G. tomentella</i>	277	21
		<u><i>G. sp.</i></u>	<u>1</u>	<u>0</u>
		Perennial subtotal	919	117
Collection total	20615			

Number of accessions screened for pests and diseases, data entered in GRIN:

Type	Descriptor	Qualifier	Accessions screened
Disease	Bacterial pustule		3438
Disease	Bean Pod Mottle Virus		292
Disease	Brown stem rot		4032
Disease	Frogeye C-32 Isolate		1688
Disease	Frogeye race 2		2676
Disease	Frogeye, unspecified race		115
Disease	Peanut Mottle Virus		2150
Disease	Phytophthora Rot	Race 1	9987
Disease	Phytophthora Rot	Race 2	432
Disease	Phytophthora Rot	Race 3	2822
Disease	Phytophthora Rot	Race 4	1477
Disease	Phytophthora Rot	Race 5	797
Disease	Phytophthora Rot	Race 6	136
Disease	Phytophthora Rot	Race 7	2979
Disease	Phytophthora Rot	Race 8	148
Disease	Phytophthora Rot	Race 9	95
Disease	Phytophthora Rot	Race 10	629
Disease	Phytophthora Rot	Race 12	646
Disease	Phytophthora Rot	Race 17	2235
Disease	Phytophthora Rot	Race 20	659
Disease	Phytophthora Rot	Race 25	2844
Disease	Phytophthora Rot	Race 30	115
Disease	Phytophthora Rot	Race 30T	263
Disease	Phytophthora Rot	Race 31	145
Disease	Phytophthora Rot	Race 33	113
Disease	Phytophthora Rot	Race 38	65
Disease	Pythium ultimum		1290
Disease	Soybean mosaic virus		197
Disease	Asian soybean rust	Mixed isolates	3639
Disease	Stem canker		1489
Insect	Beet armyworm		430
Insect	Corn Ear Worm		27
Insect	Leaf hopper injury		784
Insect	Mexican Bean Beetle damage		5056
Insect	Soybean Looper		2714
Insect	Velvetbean caterpillar		541
Nematode	Cyst nematode	Race 1	1194
Nematode	Cyst nematode	Race 2	114
Nematode	Cyst nematode	Race 3	12433
Nematode	Cyst nematode	Race 4	7377
Nematode	Cyst nematode	Race 5	11601
Nematode	Cyst nematode	Race 14	2477
Other	Chlorosis score		2810
Other	Salt reaction		564

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