

# Sugar Beet CGC Meeting

(in conjunction with the ASSBT Meeting 2 in Albuquerque, NM, March 2 - 6, 2011)

Wednesday, March 2 – 8:00 until 12:00 noon

in the Fiesta I & II Rooms at the Albuquerque Hyatt Regency

- 1) Membership Elections
  - a) Members whose seat is up for election
    - i) Mitch McGrath
    - ii) Roy Martens
    - iii) Larry Campbell
    - iv) Bob Harveson
    - v) Lee Panella
- 2) Chairperson Election
- 3) Curator's Report – Barbara Hellier
- 4) Collection Trips
  - a) Discussion of Morocco collection trip(s)
- 5) Reminder to send seed from new releases to Pullman
- 6) Questions about the CGC Chairs Meeting
- 7) Status of *Beta* report and vulnerability report
- 8) Should we develop a “core” of old ARS releases, and other developed germplasm in the NPGS?
  - a) Other beet culti-groups
    - i) Table beet
    - ii) Fodder beet – especially for “Energy Beets”
    - iii) Swiss Chard
- 9) New Business
  - a) Discuss a potential collecting trip to the Imperial Valley, CA.
  - b) Discuss heirloom table beet varieties - Irwin Goldman's proposal
  - c) Questions on the 2011 NGRL Report

Members attending the CGC Meeting were Mitch McGrath, Margaret Rekoske, Lee Panella, Kelley Richardson, Roy Martens, and Imad Eujayl. Excused were Klaas Van der Woude and Robert Harveson, Gary Franc, and Larry Campbell.

Ex-officio members attending were: Barbara Hellier, Gail Wisler, and Jingou Hu.

Interested parties attending were: Werner Beyer (KWS), Guner Diener (KWS), Carl Strausbaugh (USDA-ARS), Jan Sels (SES vanderHave), and Britt-Louise Lennefors (Syngenta)

### **1. Membership Elections**

Re-elected for another four year term were Mitch McGrath, Roy Martens, Larry Campbell, Bob Harveson, and Lee Panella.

### **2. Chairman Election**

Lee Panella was reelected as chairman of the Sugar Beet Crop Germplasm Committee

### **3. Curator's Report - Barbara Hellier (See appendix 1 for PowerPoint presentation)**

Status Report on the *Beta* Collection at the  
Western Regional Plant Introduction Station (WRPIS)  
to the Sugar beet Crop Germplasm Committee  
Barbara Hellier (Curator) March 2, 2011

The *Beta* collection at the Western Regional Plant Introduction Station in Pullman, WA currently has 2,542 accessions with 1,875 accessions (73.8 %) available and 1,948 (76.6 %) backed-up at the National Center for Genetic Resources Preservation (NCGRP), Fort Collins, CO. Table 1 contains a breakdown of the collection by species.

From January 1, 2009 to December 31, 2010, we received 191 orders (an increase of 89 from the previous reporting period) from 163 requestors. A total of 944 accessions and 1907 seed packets (an increase of 559 from previous reporting period) were distributed. In the same time period, we acquired 13 new accessions, all *B. vulgaris* breeding lines from the US. Reported use of the requested *Beta* germplasm was for disease resistance screening, student projects, frost tolerance screening, pigment analysis, reclamation, winter hardiness trials, iron deficiency work, forage use potential, salinity tolerance trials, heat and draught stress trials, genetic diversity screening, archaeobotanical reference, ornamental breeding, for use as wildlife vegetation plantings, and home gardening. Of the 191 orders only 36 went to individuals.

#### **Regeneration and maintenance activities:**

We continue to focus our regeneration efforts on accessions of *B. v. ssp. maritima* and wild species. The majority of our increases are done in the greenhouse. We are using all available, suitable spaces in the WRPIS and Washington State University greenhouse systems, a total of 13 to 19 rooms. In 2009 and 2010 in Pullman, we regenerated/increased a total of 48 accessions of *B.v. ssp maritima* and harvested seed from the *B. nana* plants in the field (43 plants). In fall 2009

and 2010 we sent 60 and 80 *B. v. ssp vulgaris* accessions respectively, to Dr. Kelley Richardson for increase in Salinas, CA. We appreciate her willing to do this.

**Table 1. Total number of accessions and number backed-up per species in the NPGS *Beta* collection.**

Taxon	Total Accessions	Accessions Backed-up
<i>Beta corolliflora</i>	4	3
<i>Beta hybrid</i>	2	1
<i>Beta lomatogona</i>	29	4
<i>Beta macrocarpa</i>	15	12
<i>Beta macrorhiza</i>	20	2
<i>Beta nana</i>	21	0
<i>Beta patula</i>	3	3
<i>Beta sp.</i>	16	5
<i>Beta trigyna</i>	48	5
<i>Beta vulgaris</i>	27	22
<i>Beta vulgaris ssp. maritima</i>	572	403
<i>Beta vulgaris ssp. vulgaris</i>	1725	1466
<i>Beta vulgaris ssp. vulgaris ( NCGRP &amp; CSR)</i>	24 (14 CSR)	
<i>Beta x intermedia</i>	8	1
<i>Patellifolia patellaris</i>	29	14
<i>Patellifolia procumbens</i>	15	5
<i>Patellifolia webbiana</i>	8	2

From January 1, 2009 to December 31, 2010 ninety-one *Beta* accessions were tested for viability (17 at NCGRP and 74 at WRPIS) and 13 accessions were sent to NCGRP for back-up. During increase and regeneration we collected the following descriptor data on each accession: hypocotyl color, bolting tendency, cluster fasciation, flowering pattern, leaf hairiness, leaf width (min. and max.), leaf length (min. and max.), leaf pigment, petiole color, susceptibility to *Erysiphe* sp., and images of pre-bolt plants and roots.

In June 2010 Dr. Lee Panella and I participated in a collecting trip to Morocco (see our poster). We explored the Moroccan coast from Rabat south to Laayoune adding 16 new accessions of *B. v. ssp maritima* and 15 of *Patellifolia patellaris*.

**From 2009 CGC report.**

Table 2 shows the number of *Beta* accessions per priority group per species. Priority group 1 = accessions with < 100 viable seed. Priority group 2 = accessions with 100-500 viable seed. Priority group 3 = accessions with 500-1000 viable seed or accessions with over 1000 viable seed and < 50% germination. Priority group 4 = accessions with 1000-5000 viable seed and >50% germination. Priority group 5 = accessions with over 5000 viable seed and > 50% germination or if no germination data is < 20 yrs old.

**Table 2.**

Taxon	Priority Group				
	1	2	3	4	5
<i>Beta corolliflora</i>			3	1	
<i>Beta hybrid</i>	1				1
<i>Beta lomatogona</i>	18	4	1	5	1
<i>Beta macrocarpa</i>	1	4	1	4	6
<i>Beta macrorhiza</i>	14	3	1		1
<i>Beta nana</i>	21				
<i>Beta patellaris</i>	4	3	2	9	11
<i>Beta patula</i>	1	2			
<i>Beta procumbens</i>				4	7
<i>Beta sp.</i>	6	2	2	3	3
<i>Beta trigyna</i>	34	6	2	4	2
<i>Beta vulgaris ssp. maritima</i>	35(6)*	50(20)	91(27)	182(44)	212
<i>Beta vulgaris &amp; ssp vulgaris</i>	47	207	276	614	597
<i>Beta webbiana</i>	1		5	1	1
<i>Beta x intermedia</i>	7				1

\* (X) Number of accessions currently being regenerated or increased.

1373 accessions have germination of 65% or greater and 2152 accessions have been tested for viability.

#### 4) Collection Trips

- a) Discussion of Morocco collection trip(s)
- b) Discuss a potential collecting trip to the Imperial Valley, CA.

##### Report on 2010 Collection Trip to Morocco.

**Background:** The USDA Agricultural Research Service's National Plant Germplasm System's (NPGS) *Beta* collection is comprised of 2,541 accessions from 14 species. The largest number of accessions is from *Beta vulgaris ssp. vulgaris*, (domesticated beet crops – table, leaf (Swiss chard), fodder and, primarily, sugar beets) and *Beta vulgaris ssp. maritima* (sea beet, the progenitor and wild relative of domesticated beet). *Beta* accessions in this collection originate from 54 countries worldwide. Accessions of wild sea beet, *Beta vulgaris ssp. maritima*, a source of resistance genes for cultivated beet, are well represented from locations along the northern Mediterranean coast and up the Atlantic coast into Norway. Collections from wild populations along the southern Mediterranean coast and down the northern African Atlantic coast are not well represented, and were completely lacking from Morocco.

**Discussion:** In the 2010 National Plant Germplasm System funded Southern Morocco plant exploration the coast of Morocco was explored from Rabat to Laayoune. This was a joint mission of the USDA-ARS and the Moroccan National Institute of Agronomy Research (INRA). The exploration party consisted of two US participants, Barbara Hellier and Dr Lee Panella, two Moroccan participants, Dr. Yasmina El Bahoul and Naima Qariouh, and our invaluable driver. Over 2400 km were covered. Two species of *Beta/Beta* relatives were found. *Beta vulgaris ssp*

*maritima* occurred from Rabat to Plage Blanche (on the coast west of Guelmim). *Patefolia patellaris* (formerly *Beta patellaris*) was found from Safi to El Marssa, on the coast west of Laayoune. The distribution of *P. patellaris* roughly coordinates with the Moroccan coastal ecoregion, as defined by the World Wildlife Fund (Olson 2001). *B.v. maritima* mostly occurred in the Mediteranian woodland and shrub region but also extended down into the northern Haouz-Argana Mediteranian shrubland region. All sites where these two species were found were disturbed: new or old construction sites, garbage dumps, fallow fields, abandoned city lots, eroded/eroding rocky beaches. Many sites were surveyed where no beet was found. These included heavily grazed areas, which appeared to be the appropriate habitat, undisturbed sites with a dominant shrub layer, and in the south, sites without supplemental water. A total of 31 new accessions were collected. All seed samples collected were split equally between the US NPGS and INRA Morocco genebank. After seed increase, the material will be used in diversity studies and screened for disease resistance and salt tolerance and is of interest to US, European, and Moroccan breeders and scientists.

### **2012 Planned Collection Trip to Morocco**

**Discussion:** Due to time constraints, this exploration mission went south from Rabat along the Atlantic coast. Therefore, a proposal for a second mission (in 2012) was made to cover the Atlantic coast from Rabat north and then the Mediterranean coast of Morocco. This collection trip is planned with the same Moroccan collaborators and Barbara Hellier and Chris Richards from USDA-ARS will be part of this mission. It is hoped that in addition to *B.v. maritima*, some accessions of *Beta macrocarpa* may be collected.

### **Potential Collection Trip to California**

**Discussion:** The Imperial Valley in California is the only sugar beet producing region for the state and *Beta macrocarpa* has long been a weed problem in sugar beet fields. The U.S. Beet Sugar industry feels it is extremely important to collect from the wild beets in the Imperial Valley to understand the origin of the population, determine the species, and explore whether or not there may be gene flow between these wild beets and cultivated beet. The California Sugarbeet Producers through the Beet Sugar Development Foundation have agreed to sponsor a collecting trip to the Imperial Valley. We discussed the potential for collecting throughout the rest of California, especially with reference to the report of Bartch and Ellstrand (1999) discussing the wild beet found throughout California and the fact that none were entered into the NPGS genebank. Since 1928 wild beets have been reported in California (especially Southern California) (list of publications below). Seed, tissue samples, herbarium specimens and locality data would be collected and incorporated into a National Plant Germplasm System *Beta* collection. A voice vote was taken, and it was unanimous in favor of recommending a California collection trip.

- Bartsch, D., and N.C. Ellstrand. 1999. Genetic evidence for the origin of Californian wild beets (genus *Beta*). *Theor. Appl. Genet.* 99:1120-1130.
- Carsner, E. 1928. The wild beet in California. *Facts About Sugar* 23:1120-1121.
- Carsner, E. 1938. Wild beets in California. *Proc. Am. Soc. Sugar Beet Technol.* 1:79.
- Dahlberg, H.W., and H.E. Brewbaker. 1948. A promising sugar beet hybrid of the Milpitas wild type x commercial. *Proc. Am. Soc. Sugar Beet Technol.* 5:175-178.
- McFarlane, J.S. 1975. Naturally occurring hybrids between sugarbeet and *Beta macrocarpa* in the Imperial Valley of California. *J. Am. Soc. Sugar Beet Technol.* 18:245-251.

**5) Reminder to send seed from new releases to Pullman**

All of the ARS researchers that develop new germplasm are reminded to send seed to Pullman. Seed must be sent to the NCGRP for a PI number to be issued. If we at that time send 200 grams of seed to Barbara Hellier at Pullman, then she will not have to expend resources to do an increase from the NCGRP seed lot.

**6) Questions about the CGC Chairs Meeting**

A brief outline of the topics discussed at the 2010 CGC Chairs meeting was present (see appendix 2). There were no direct questions and members were directed to the URL with all of the presentations: <http://www.ars-grin.gov/npgs/cgc2010mtg.html>

**7) Status of *Beta* report and vulnerability report**

There was nothing to report at this time. The chairman will continue to work on these documents.

**8) Should we develop at “core” of old ARS releases, and other developed germplasm in the NPGS?**

- a) **Other beet culti-groups**
  - i) **Table beet**
  - ii) **Fodder beet – especially for “Energy Beets”**
  - iii) **Swiss Chard**

We would like to go through the list of ‘improved germplasm’ in the collection and develop a core collection, especially before more of the ‘institutional memory’ retires. The curator will work on getting a list of all ARS releases to the chairman as a starting point.

**9) New Business**

- a) **Discuss heirloom table beet varieties - Irwin Goldman's proposal**

There was a brief discussion of heirloom table beet varieties and Roy Martens wondered how to put them into the collection. They can be donated. Irwin Goldman was proposing to evaluate the morphological and botanical traits of table beet varieties in our collection. It would call for evaluation both in Madison, WI and Pullman, WA. The committee supported the proposal.

- b) **Questions on the 2011 NGRL Report**

The report had been sent to the members and there were no questions. It is in Appendix 3 at the end of this report.

## **APPENDIX 1**

# *Beta* genetic diversity conservation

Western Regional Plant Introduction Station

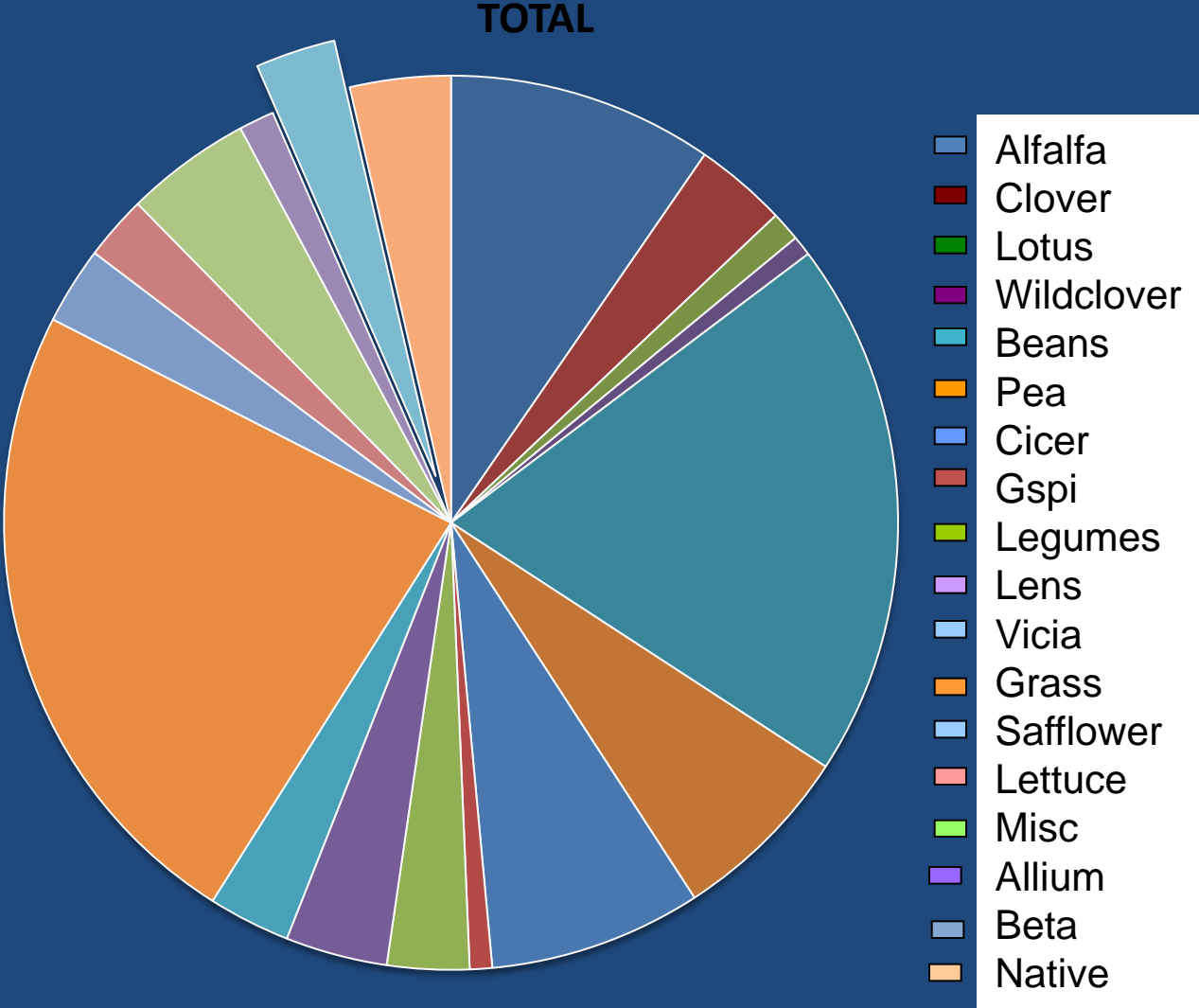


USDA-ARS  
National Plant Germplasm System  
Pullman, WA

Dr. Jinguo Hu, Research Leader  
Barbara Hellier, Curator  
Marie Pavelka, Technician



# WRPIS inventory maintenance groups



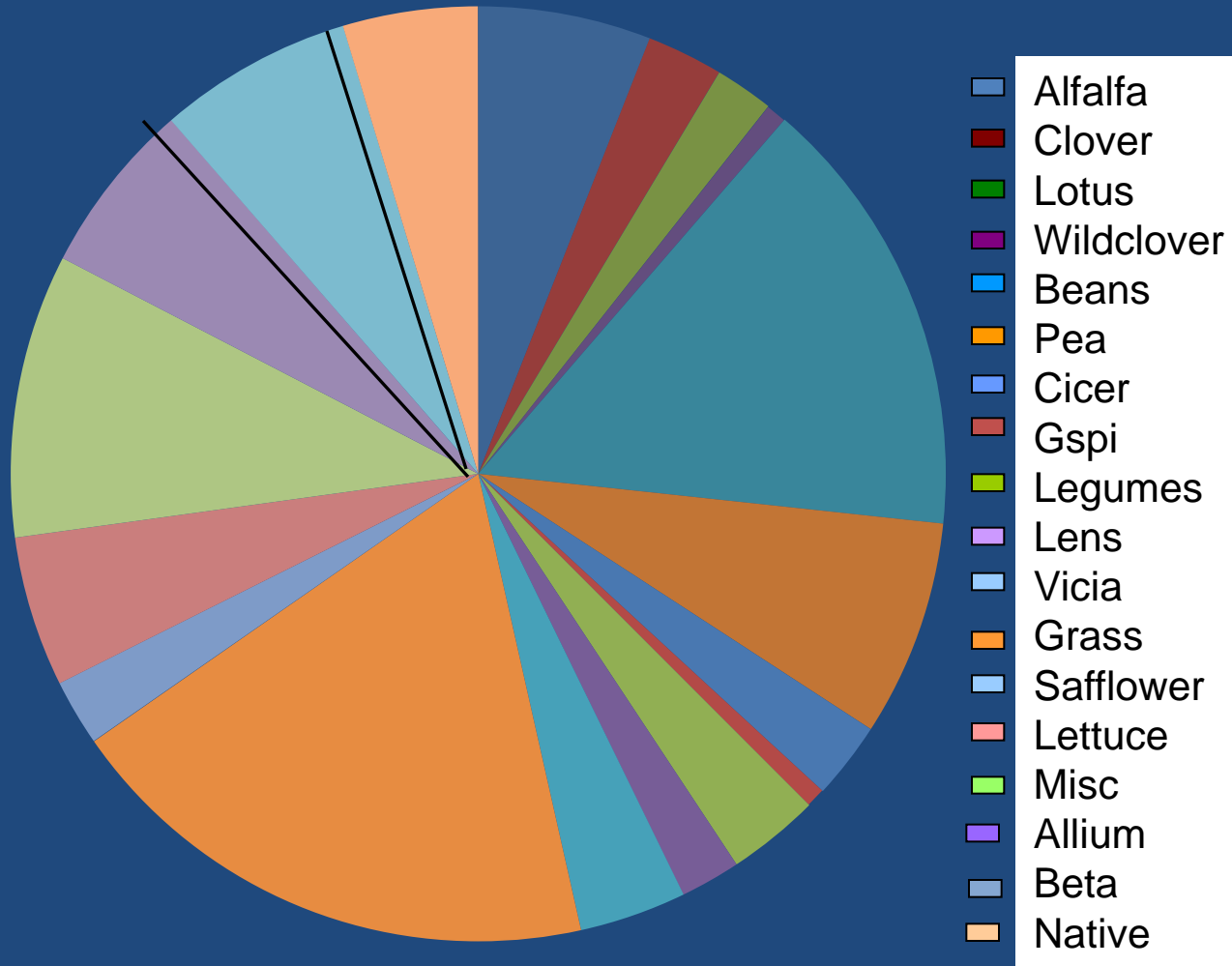
**Total number of accessions per species in the NPGS Beta collection.**



<b>Taxon</b>	<b>Total Accessions</b>
<i>Beta corolliflora</i>	4
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<i>Beta macrorhiza</i>	20
<i>Beta nana</i>	21
<i>Beta patula</i>	3
<i>Beta sp.</i>	16
<i>Beta trigyna</i>	48
<i>Beta vulgaris</i>	27
<i>Beta vulgaris ssp. maritima</i>	572
<i>Beta vulgaris ssp. vulgaris</i>	1725
<i>Beta vulgaris ssp. vulgaris</i> ( NCGRP & CSR)	24
<i>Beta x intermedia</i>	8
<i>Patellifolia patellaris</i>	29
<i>Patellifolia procumbens</i>	15
<i>Patellifolia webbiana</i>	8

# WRPIS seed requests by inventory maintenance group

ORDERS







**One accession of *B.v. ssp maritima* growing in one of the greenhouse spaces at Washington State University, 2011.**





Revernalized partially  
bolted *B.v. ssp maritima*  
plants from two  
accessions





PI 518354 plant and root images



below: *B.v.ssp maritima*

left: Lee Panella collecting south of El Jadida



above: *P. patellaris*, right: participants in the 2010 Morocco Expedition

## APPENDIX 2



## 2010 CGC Chair Biennial Meeting

July 27-28, 2010 : Geneva, NY

<http://www.ars-grin.gov/npgs/cgc2010mtg.html>

Presentations are available at the web-site above

### July 27, 2010

- 6:30 – 7:45 Continental Breakfast
- 8:00 – 8:20 Welcome (Peter Bretting, Gary Kinard)
- 8:20 – 9:00 CGC Roles and Responsibilities
- 9:00 – 10:00 Curator/CGC Interactions – A Curator's Perspective  
(Panel Presentations and Discussion)
- 10:00 – 10:30 **Break**
- 10:30 – 12:00 GRIN Global Overview/Public Demonstration/Discussion  
(Gary Kinard, Marty Reisinger, Mark Bohning)
- 12:00 – 1:00 **Lunch**
- 1:00 – 1:30 GRIN Global Discussion
- 1:30 – 2:00 Plant Germplasm Exchange/Exploration (Karen Williams)
- 2:00 – 2:30 GRIN Taxonomy CWR Gene Pool Project (John Wiersema)
- 2:30 – 3:00 CGC Alternate Meeting Options (Gary Kinard, Mark Bohning)
- 3:00 – 3:30 **Break**
- 3:30 – 4:30 Discussion of General CGC Topics  
(CGC Chairs, NPGS Personnel)

**July 28, 2010**

- 8:00 – 8:30 Welcome  
Dariusz Swietlik, North Atlantic Area Office/Herb Aldwinkle, Cornell
- 8:30 – 8:45 Introductions and Agenda Changes – Dave Ellis
- 8:45 – 9:15 Office of National Programs Report – Peter Bretting
- 9:15 – 9:45 NIFA Update – Ann Marie Thro
- 9:45 – 10:00 CGC Update – Mark Bohning
- 10:00 – 10:15 Open Discussion/Questions on NPS, NIFA, CGCs
- 10:15 – 10:30 **Break**
- 10:30 – 11:30 Germplasm Issues Update (15 Minutes Each)
- International Exchange and Capacity Building  
Ned Garvey, Karen Williams
- Quarantine Issues – Gary Kinard
- DBMU Update – Gary Kinard
- NCGRP Update – Dave Dierig
- 11:30 – 12:00 GRIN-Global Status Report – Gary Kinard, Marty Reisinger
- 12:00 – 1:30 **Lunch**
- 1:30 – 4:30 Tour of PGRU Facilities

## APPENDIX 3

**National Germplasm Resources Laboratory**  
**USDA-ARS**  
**Beltsville, Maryland**  
**2011 Report to PGOC, RTACs and CGCs**

The National Germplasm Resources Laboratory (NGRL), Beltsville, MD, supports the acquisition, introduction, documentation, evaluation, and distribution of germplasm by the National Plant Germplasm System (NPGS) and other components of the U.S. National Genetic Resources Program (NGRP). The Laboratory is comprised of the Plant Exchange Office (PEO), the Germplasm Resources Information Network/Database Management Unit (GRIN/DBMU), and the Plant Disease Research Unit (PDRU), whose functions are provided below. Dr. Gary Kinard has been the Research Leader for NGRL since January 2009.

## **Plant Exchange Office**

### **Plant Exploration and Exchange Program**

The PEO supports the collection of germplasm for the NPGS through the management of a Plant Exploration and Exchange Grant Program. Plant explorations involve field collection of germplasm not available in any germplasm repositories, while plant exchanges are expeditions to facilitate the transfer of germplasm already conserved in foreign genebanks. Annual guidelines for developing plant exploration and exchange proposals are prepared by the PEO and distributed to researchers.

An extensive review procedure is used to assess the relevance of the proposals to the NPGS needs and the likelihood that the proposed explorations or exchanges will accomplish their stated objectives. Before submission, proposals are reviewed by the appropriate CGC or other crop experts. After submission to the PEO, proposals are reviewed by a subcommittee of the NPGS Plant Germplasm Operations Committee (PGOC). The PEO then evaluates the proposals and the PGOC reviews and makes recommendations on funding to the ARS Office of National Programs (ONP).

All foreign explorations supported by PEO comply with the provisions of the Convention on Biological Diversity on access and benefit sharing related to genetic resources. Prior informed consent to collect genetic resources is obtained from the appropriate host country before the exploration occurs. The permission includes agreement on the benefits to the host country associated with access to genetic resources. The PEO is involved in most requests to foreign governments for permission to collect and negotiates the terms of agreements when necessary. Foreign explorations are always conducted in cooperation with scientists from the host country and cooperation with their national genetic resources programs is strongly encouraged. Germplasm obtained on explorations is shared by the NPGS and the host country.

### **Facilitation of Germplasm Exchange**

The PEO assists NPGS personnel and other scientists with acquiring germplasm from scientists, foreign national and international genebanks, domestic and foreign explorations, and special projects and agreements. The PEO also helps to expedite the distribution of germplasm from the NPGS to foreign scientists and other international genebanks.

In FY 2009, PEO assisted with the distribution of 754 shipments with a total of 60,323 NPGS accessions to scientists in 67 different countries. PEO also assisted with importing 17 shipments containing 447 items from different 17 countries for the NPGS and ARS.

In FY 2010 PEO assisted with the distribution of 861 shipments with a total of 38,244 NPGS accessions to scientists in 77 different countries. PEO also assisted with importing 33 shipments containing 654 items from 19 different countries for the NPGS and ARS.

In the first quarter of FY 2011 (October-December 2010), PEO assisted with the distribution of 211 shipments with a total of 8,963 NPGS accessions to scientists in 47 different countries. PEO also assisted with importing 9 shipments containing 336 items from 4 different countries for the NPGS and ARS. It is estimated that in FY 2011 PEO will assist with more than 900 shipments to 80 different countries.

### **GRIN Taxonomy for Plants**

GRIN Taxonomy provides online current and accurate scientific names and other taxonomic data for the ARS National Plant Germplasm System and other worldwide users. This standard set of plant names is essential for effective management of ARS plant germplasm collections, which now represent nearly 13,400 taxa. GRIN taxonomic data now include scientific names for 26,650 genera (14,120 accepted) and 1,330 infra-genera and 93,970 species or infra-species (55,700 accepted) with nearly 45,760 common names, geographical distributions for 50,340 taxa, 380,820 literature references, and 24,920 economic impacts. A broad range of economically important plants are supported by GRIN nomenclature, including food or spice, timber, fiber, drug, forage, soil-building or erosion-control, genetic resource, poisonous, weedy, and ornamental plants. Most or all species of important agricultural crop genera are represented. Information about the systematic relationships of species is provided, which is critical for optimally determining the disposition or use of individual germplasm samples. Included in GRIN Taxonomy are federal- and state-regulated noxious weeds and federally and internationally listed threatened and endangered plants, with links to information on noxious weed and conservation regulations to ensure unimpeded interstate and international exchange of plant genetic resources. The scientific names are verified, in accordance with the international rules of botanical nomenclature by taxonomists of the National Germplasm Resources Laboratory using all available taxonomic literature and consultations with taxonomic specialists. Generally recognized taxonomic database standards have been adopted in GRIN Taxonomy.

The current focus of GRIN taxonomic work is to ensure that scientific plant names in GRIN continue to reflect recent plant taxonomic and nomenclatural literature, and that new data on classification, synonymy, native and naturalized distribution, economic impacts, and common names for plants and economic use categories currently treated in GRIN are incorporated. Recent efforts have focused on improving the documentation of sources for the information provided in GRIN Taxonomy. We also seek to expand the nomenclatural, classificatory, and ecogeographical information for crop taxa and their relatives. In late 2008 a project to provide thorough coverage in GRIN-Taxonomy to wild relatives of all major and minor crops was initiated. We have now completed work on 38 crops, and an interface to query these data in various ways has been developed ([www.ars-grin.gov/~sbmljw/cgi-bin/taxcrop.pl](http://www.ars-grin.gov/~sbmljw/cgi-bin/taxcrop.pl)). The breadth of coverage and quality of GRIN taxonomic data has encouraged usage of GRIN-Taxonomy data among genetic resource managers and other agricultural workers worldwide. GRIN taxonomic data are the most requested item on public GRIN, with ca. 800,000 of these reports retrieved monthly.

### **PI Documentation**

Since 1898, Plant Introduction (PI) numbers have been used as unique identifiers for accessions incorporated into the NPGS. In earlier times, PI numbers were automatically assigned to all plant material received by the Plant Introduction Office, a predecessor of the PEO. Currently, before PI numbers are assigned, NPGS curators first evaluate the passport data, and if possible grow and observe new accessions to verify uniqueness and rationale for preservation in the NPGS. For this reason, curators usually assign a local identifying number to an accession until a decision is made to assign a PI number. When the decision is reached to assign a PI number to an accession, the curators contact Mark Bohning in DBMU for assignment of the next sequential number(s).

In FY 2010, the NGRL in collaboration with the National Agriculture Library completed the digitization of the PI Books. The digitized books are now available on the National Agricultural Library (NAL) website: <http://ddr.nal.usda.gov/>, (select United States Department of Agriculture, then USDA/ARS Plant Inventories). The PI Books should also be available on the GRIN website sometime in 2011. In addition, the Accession records in GRIN are being modified so there is a link (*View original Plant Inventory data*) with the appropriate page in the PI Book. The Plant Immigrant Series is currently under contract to be digitized and should be available to the public in either late 2011 or early 2012.

### **International Collaboration**

PEO works with other U.S. and international programs to support plant germplasm conservation and exchange worldwide. The PEO continues to collaborate with USDA/FAS and USDA/ARS/OIRP to develop joint germplasm collection, conservation and maintenance programs in Guyana, Jordan, Morocco, Tunisia, Georgia and Azerbaijan using US Food for Peace and other programs.

Since 2002, PEO has been collaborating with the plant genetic resources programs of the eight Central Asia and the Caucasus countries: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Armenia, Georgia and Azerbaijan. This program is organized by ICARDA (International Center for Research in the Dry Areas) and the focus is on development of national plant inventories, staff training, and plant exploration.

### FY 2010 NPGS Plant Explorations

Target Crop	Country	Principal Contacts
Wild beet	Morocco	B. Hellier, L. Panella, Y. Bahloul, N. Qariouh
Small grains	Armenia	K. Tamanian, G. Fayvush
Lettuce	Georgia	M. Mosulishvili, G. Arabuli
Small grains	Georgia	M. Eristave, L. Kobakhidze
Lettuce	Russia	S. Litvinskaya, R. Murtazaliev
Ash	China	W. Kang
Fruits and nuts	Georgia	M. Aradhya, D. Maghradze, Z. Bobokashvili
Cool-season grasses	Russia	D. Johnson, P. Johnson, N. Dzyubenko, E. Dzyubenko
Spanish lime	United States (PR, USVI), Trinidad and Tobago	B. Irish, I. Reyes, C. Bermudez, E. Chichester, P. Perez, E. Ramkhelawan
Sunflower	United States (MO, KS, OK, AR)	L. Marek, G. Seiler
Woody ornamentals	United States (OH)	J. Carstens, M. Scanlon
Carrot relatives	United States (many states)	P. Simon, D. Spooner
Ash	United States (WI, MN)	M. Widrlechner, E. Humenberger
Ash	United States (KS, MO, AR)	J. Carstens, M. O'Hearn
Grain amaranths and bedding plants	United States (AZ)	D. Brenner, S. Stieve
Kentucky coffeetree	United States (MO, AR, TN, KY, IL, IA)	J. Carstens, A. Schmitz
Lesquerella	United States (NM, TX, AZ)	D. Dierig, M. Cruz
Ornamentals	United States (TX)	P. Jordan, S. Stieve
Potato	United States (AZ)	J. Bamberg, A. Del Rio
<i>Juglans</i> spp.	United States (TX)	L.J. Grauke

## Database Management Unit

### GRIN and GRIN-Global

The mission of the GRIN Database Management Unit (DBMU) is to develop and maintain information systems for the National Genetics Resources Program comprised of plants, animals, microbes, and invertebrates. Recent statistics for data in the plant database include:

- Over 95,800 taxonomic names (including synonyms)
- 535,473 accessions representing 13,388 species and 2,208 genera
- 1,866,764 inventory records
- 1,628,283 germination records
- 7,291,757 characteristic/evaluation records
- Over 201,156 images

Germplasm accessions acquired by the National Plant Germplasm System (NPGS) since the effective date of the Convention on Biological Diversity continue to be flagged in the database with appropriate disclaimers and MTAs. The new SMTA issued under the International Treaty is also flagged and tracked through the system. These agreements are displayed with accession passport data and automatically printed on GRIN generated packing slips when accessions are distributed. During the past year, the DBMU continued to provide support to NPGS site personnel and assisted NPGS sites in loading passport data, evaluation data, distribution information and images into the database

The GRIN-Global project is a cooperative effort between the Global Crop Diversity Trust (GCDDT), USDA-ARS and Bioversity International to develop a powerful, easy-to-use plant genetic information system that will be freely available to any country throughout the world. NPGS personnel at Ames, IA and Beltsville, MD are leading the project. The international component of the project is almost complete and will be released in early 2011. A demonstration of the new public software was presented at the biennial CGC Chair, Regional Technical Advisory Committees and Plant Germplasm Operations Committee joint meetings in Geneva, NY July 27-29, 2010. The technical steering group (TSG) for the GRIN-Global project held their final meeting in September 2010. They provided important guidance and recommendations to the development team throughout the project. A demonstration of the beta version GRIN-Global public website project will also be presented at the Plant & Animal Genome XIX meeting in January 2011. Training sessions for GRIN-Global international trainers (Train the Trainers) was held April 12-23, 2010 in Beltsville, Maryland and November 15-22, 2010 in Ames, IA. Eighteen international participants attended the Beltsville session and 10 attended the Ames session. They all learned how to use the GRIN-Global application and offered their comments and suggestions. Beginning in 2011, these international collaborators will assist in deploying the system to the international community.

The second phase of the project, implementing GRIN-Global for the NPGS, has begun. GRIN-Global will replace the current GRIN system with new site maintenance and



public retrieval software. All the NPGS sites will be contacted to ensure all site specific software will be incorporated into the new system. The target date for full NPGS deployment is early to mid 2012.

The development team is always interested in receiving feedback from the user community on the GRIN-Global NPGS public website. A beta version of the GRIN-Global public website can be found at:

<http://test.grin-global.org>

Comments, ideas and suggestions can be sent to [feedback-grin.global@ars.grin.gov](mailto:feedback-grin.global@ars.grin.gov)

GRIN has been enhanced to handle molecular data. New tables have been added to the database to store this data and software has been developed to display it. SSR data generated on apple, cacao, grape, hazelnut, hops, pear and blueberry, along with AFLP data on Rhubarb, has been loaded into the system.

The GRIN system was available 98% of the time on a 24 hour a day and 7 day a week schedule. Access to the database through the web pages continues at a brisk pace. In 2010, there were 1,928,387 visits to the GRIN database. We always encourage users to send any comments on the current GRIN system by email to [dbmu@ars-grin.gov](mailto:dbmu@ars-grin.gov).

Security measures for the hardware and databases are regularly reviewed and constantly monitored for intrusion by those who may attempt to corrupt web pages or to destroy data. New security patches are implemented as soon as they become available. The system is protected by a firewall and all data are backed up at onsite and offsite locations. Backup tapes are kept at several local offsite locations, including one set at Ft. Collins, CO for long term storage. The system has an Uninterruptible Power Supply for short term power outages and a diesel generator for longer power outages. The building housing NGRL is secured with access permitted only by proximity card. The GRIN server room is locked with further limited proximity card access and the room is monitored for temperature fluctuations 24/7/365.

### **Crop Germplasm Committees**

Since June 1, 2010, over 20 of the 42 Crop Germplasm Committees (CGC) have met. An NGRL representative was present at most of the meetings, or participated via teleconference, to help facilitate their activities. Summaries of each meeting are prepared and distributed to appropriate National Program Leaders, NGRL staff and other NPGS personnel. The committees continue to provide advice on all aspects of the NPGS including identifying gaps and duplications in the collections, germplasm maintenance and evaluation, quarantine issues and maintaining updated versions of the crop vulnerability reports. The 13<sup>th</sup> biennial meeting of the CGC Chairs was held in Geneva, NY July 27-28, 2010 in conjunction with the Plant Germplasm Operations Committee and the Regional Technical Advisory Committees. This meeting provided an opportunity for the Chairs to hear presentations on the status of NPGS sites, plant germplasm

exchange, international issues, preservation and utilization, the molecular characterization of accessions, interactions between curators and CGCs and plant quarantine issues. One of the major topics presented was a demo and discussion of the new GRIN-Global public interface. The meeting also allowed the Chairs to meet and interact with each other, NPGS managers and curators, and invited guests from ARS, other government agencies, and non-governmental organizations. As recommended at the meeting, a video conference/webinar will be held in the spring of 2011 to keep the CGC chairs updated on all issues within the NPGS.

## **Plant Disease Research Unit**

Since October 1, 2005, the responsibilities for the quarantine indexing and distribution of prohibited genera germplasm that were performed by the former ARS Plant Germplasm Quarantine Office were transferred to APHIS-Plant Germplasm Quarantine Program (APHIS-PGQP). The quarantine program manager for APHIS-PGQP is Dr. Joseph Foster. For ARS, three SYs (Gary Kinard, Ruhui Li, and Ray Mock) and nine support staff now comprise the Plant Disease Research Unit within National Germplasm Resources Lab (NGRL-PDRU). The mission of NGRL-PDRU is to conduct research to understand the biology of pathogens that infect economically important prohibited genera plant germplasm, including their etiology, detection, and elimination by therapeutic procedures. These projects provide support to the APHIS quarantine programs and help facilitate the safe introduction and international exchange of valuable plant germplasm.

### **Personnel**

Ray Mock works with sugarcane, and deciduous tree and small fruits. Dr. Ruhui Li provides molecular support for all unit projects and works more intensively on sugarcane, sweet potato, grasses, and stone fruits. Whitney Hymes, who was a student employee in PDRU for several years, began working in a permanent position as a Biological Science Research Technician in May 2010 and provides molecular lab support. Sam Grinstead, a Biological Science Research Technician, provides greenhouse support for the unit. Dr. Eun Ju Cheong was hired as a Support Scientist for the unit in December 2010. Her expertise is tissue culture and therapeutic methods. Four International Visiting Research Scholars have joined the lab since February 2008: Dr. Liming Lin, working on viroid detection in stone and pome fruits; Donglin Xu, working on characterization and detection of sugarcane viruses; Ae Rin Jeon, focusing on developing methods for the *in vitro* cultivation of a broad range of small fruit species, and elimination of quarantine pathogens from these 'prohibited' category crops; and Dr. Fan Li working on viruses of potatoes and sweet potatoes.

### **Research Objectives and Progress**

The NGRL-PDRU performs research on viral pathogens of quarantine significance infecting clonally propagated prohibited crop genera, with an emphasis on deciduous tree and small fruits, sugarcane, grasses, and sweet potatoes. The mission is to characterize

and investigate the etiology of poorly described diseases and pathogens of quarantine significance, and to develop more reliable detection and elimination methods. Once complete, these protocols will be submitted to the USDA, APHIS quarantine for validation and inclusion in the quarantine testing program. PDRU provides regular updates about its research projects to the CGCs that deal with prohibited genera crops. The staff regularly confers and collaborates with APHIS scientists on matters pertaining to the quarantine of plant germplasm. NGRL-PDRU personnel are glad to discuss potential collaborations with colleagues and stakeholders in the NPGS.

## Key NGRL Contacts

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