

Minutes of The Sugar Beet Crop Germplasm Committee Meeting held February 28, 2007

The Sugar Beet Crop Germplasm Committee Meeting was held February 28, 2007 from 1:00 until 4:00 PM in the Casper Room at the Little America Hotel in Salt Lake City, Utah. This meeting was held in conjunction with the American Society of Sugar Beet Technologist's biennial meeting (in Salt Lake City from February 28 – March 4 2007).

Roll Call

Present:

members - JR Stander, Klaas van der Woude, Roy Martens, Carol Windels, Mitch McGrath, Bob Lewellen and Lee Panella

ex officio: Gail Wisler (NPS), Barbara Hellier (*Beta* curator WRPIS, Pullman, WA) Carl Strausbaugh (USDA-ARS, Kimberly, ID)

Excused: Larry Campbell, Bob Harveson

Membership Elections

Members whose four year term had expired were Mich McGrath, Larry Campbell, Roy Martens, and Lee Panella. All were elected to another four year term. Lee Panella was elected as chairperson for the committee. JR Stander announced that due to his upcoming retirement he would be leaving the committee. Jay Miller of Betaseed, Inc. was nominated, and unanimously elected to fill that position.

Curator's report

Barbara Hellier gave a report on the status of the National Plant Germplasm System's (NPGS) *Beta* Plant Introduction (PI) collection, which is held in Pullman, WA, at the Western Regional Plant Introduction Station (WRPIS). (It is appended to the end of these minutes.) A good discussion was held on the potential for field increases to help decrease the regeneration backlog. We also discussed the recent collection trip to Greece to collect *Beta nana*, which had been identified as lacking in our NPGS PI collection. An abstract of the report on that trip is also appended to these minutes. All of the ARS geneticists who develop germplasm were reminded to send a sample to Pullman as well as the National Center for Genetic Resources Preservation for long term storage.

Evaluations

Although Bob Harveson was unable to attend the meeting, there was interest in seeing a proposal from him to test for a root rot complex. The chairperson will contact him to obtain this.

Collection Trips

Barbara Hellier discussed the collection trip in 2006 to Greece to collect *Beta nana*. There is a proposed collection trip to the Atlantic coast of Morocco for 2008. The Sugarbeet CGC voted

unanimously to support this trip. There are no *Beta* PIs (from any *Beta* taxa) in GRIN from this region and this coast represents an area isolated from the rest of the wild *Beta* range except for the islands of the Macaronesia ecoregion, which includes the Azores, Canary Islands, Cape Verde, Madeira, and the Savage Isle. This island ecoregion contains a diversity of *Beta* species and there are many questions about gene flow among them and between Macaronesia and the coast of Africa. The Sugarbeet CGC also endorses collecting of any other species that the expedition would be allowed to collect from this area that is not represented in the NPGS collection.

Revision of Sugarbeet Crop Germplasm Committee Report on the Status of Beta Germplasm In the United States

This report is in need of revision (last revised 1996). Much of the discussion at the meeting centered on revision of this report. Special attention was given to the section on germplasm enhancement and what the industry representatives on the committee felt were the major areas that USDA-ARS scientists should be working on in germplasm enhancement. Two major thrust areas were identified – Developing novel sources of pest resistance and Discovery of genes responsible for important traits. Along with these two areas of research, it was requested that the tools be developed to aid in this research. Genomic and proteomic tools to help determine the genetic variability of important traits were requested, as were screening methods and a better understanding of pathogen variability. All sugarbeet CGC members were given a draft of the report and asked to send in their suggestions by the end of April.

New Business

The question was asked whether the CGC should develop a *Beta* “core set” of old ARS releases, and other developed germplasm in the NPGS was discussed. Lee Panella and Bob Lewellen agreed to look into that.

It was requested that the *Beta* evaluation data from GRIN be made available on an Excel spreadsheet. Barbara Hellier said that she would look into that.

Barbara Hellier said she would try and get a list of released varieties from the various ARS stations, for which WRPIS needed more seed.

Meeting adjourned at 4:00 PM

**Status Report on the *Beta* Collection at the
Western Regional Plant Introduction Station (WRPIS)
to the Sugarbeet Crop Germplasm Committee
Barbara Hellier (Curator) February 28, 2007**

The *Beta* collection at the Western Regional Plant Introduction Station in Pullman, WA currently has 2,521 accessions with 1,785 accessions (70.8%) available and 1,898 (75.3%) backed-up at National Center for Genetic Resources Preservation (NCGRP). Table 1 contains a breakdown of the collection status by species.

Table 1. Status of the *Beta* collection.

Taxon	Total Accessions	Accessions Available	Accessions Backed-up
<i>Beta corolliflora</i>	4	1	3
<i>Beta</i> hybrid	2	1	1
<i>Beta lomatogona</i>	29	2	4
<i>Beta macrocarpa</i>	16	12	13
<i>Beta macrorrhiza</i>	20	2	2
<i>Beta nana</i>	21	0	0
<i>Beta patellaris</i>	29	17	12
<i>Beta patula</i>	3	2	3
<i>Beta procumbens</i>	15	6	5
<i>Beta</i> sp.	16	6	5
<i>Beta trigyna</i>	48	6	5
<i>Beta vulgaris</i>	21	9	16
<i>Beta vulgaris</i> ssp. <i>maritima</i>	571	445	391
<i>Beta vulgaris</i> ssp. <i>vulgaris</i>	1710	1276	1437
<i>Beta webbiana</i>	8	0	1
<i>Beta x intermedia</i>	8	1	1

From Jan. 2005 to Dec. 2006, we had 87 orders from 77 requesters. A total of 490 accessions and 786 seed packets were distributed. In the same time period, we acquired 50 new accessions: 20 accessions of *B. nana* collected in Greece in 2005, 2 accessions of *B. vulgaris* collected in Tajikistan in 2006, and 28 accessions of *B. vulgaris* cultivars from the US.

Regeneration, maintenance, and WRPIS activities:

We continue to focus our regeneration efforts on accessions of *B. v.* ssp. *maritima*, and wild species. All our increases are currently done in the greenhouse. We are using all available, suitable spaces in the WRPIS and Washington State University greenhouse systems, a total of 13-19 rooms. The following descriptor data is taken on each accession during regeneration: 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 plant and root. In 2005 and 2006 we increased a total of 51 accessions.

Because there is still a considerable backlog of *Beta vulgaris* accessions we are again addressing field increase of this material. We have experimented with field increase and had some success in Pullman but due to personnel changes in 2004 further experimentation and modifications to the field program were temporarily stopped. We are once again looking at developing a field increase protocol. In autumn 2006, we planted 4 accessions to the field: 3 accessions of *B. v. ssp vulgaris* and one accession of *B. v. ssp maritima*. We are looking at cage size, testing two cage sizes to address heat and pest accumulation in the cages in the summer. We also are looking at fall versus spring planting in both *B. v. ssp vulgaris* and *B. v. ssp maritima* to address problems we have had over-wintering beet germplasm.

We have started to work with the *B. nana* material from the 2005 Greece collection. We selected four accessions with larger seed numbers to look at germination methods. For each accession 25-27 seed were decorticated and placed on vermiculite in the greenhouse. As of 2/21/2007 germination rate ranged from 26.9 to 50.0%. The remaining non-germinated seed in vermiculite was moved from the greenhouse to 4°C. From the currently growing plants, DNA will be extracted from leaf tissue and sent to Dr Panella for optimization of microsatellite procedures. This marker system will be used for assessing the genetic diversity of the 2005 collection.

In June 2006, Dr. Richard Hannan resigned as WRPIS research leader. The time line for replacing Dr Hannan is unclear at this time. Until the position is filled the acting research leader is Dr. Daniel Skinner, Pullman, WA.

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Survey of *Beta nana* (Boiss. & Heldr.) in Greece

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Summary

The species *Beta nana* is a wild relative of cultivated beet and a potential genetic resource for beet breeding. It is a rare, but currently not threatened, alpine species endemic to Greece. Although not at risk now, climate warming in the future may make it prone to extinction. A plant exploration was conducted in 2005 to assess its conservation status 25 years after the last *B. nana* survey, and to establish a base line for monitoring. Twenty-six populations of this wild beet were found in Greece on six mountains. According to the model proposed by Guarino (1995), estimates for risk of genetic erosion fluctuated around 100 points on a scale from 0 (no risk) to 200. The population size ranged from more than 1000 individuals on Mount Olympus in the North to a few individuals on Mount Taygetos in the South. Twenty seed accessions were collected for *ex-situ* conservation, research, and evaluation; and suggestions for complementary conservation measures were made. At least three of the sites are suited for establishing and managing *in situ* genetic reserves.