

Final Performance Report

1.	State:	California
	FBMS/FAIMS Grant Number	F08AP00214 (E-2-P-32)
	Grant Name:	Seed Collection and Banking of 50 Plant Species of Critical Conservation Concern, Phase 2
	Grant Year:	2007
2.	Report Period:	8/10/2011 – 9/30/2012
	Final Report Due:	12/29/2012
	Grant Period:	8/10/2007 – 9/30/2012

3. Location of work: The project was located statewide. Habitat types varied based on the requirements of the species selected for seed collection.

4. Objectives and Expected Results: The project continued work started under a 2006 grant project (E-2-P-31). The objectives of this project (F08AP00214/ E-2-P-32) were to: 1) develop prioritized seed collection lists for listed or otherwise sensitive species of plants; 2) evaluate existing seed collections, such as that at Rancho Santa Ana Botanic Garden (RSA), to determine whether they are adequate to prevent extinction of all known populations of each taxon and provide material for future enhancements, repatriations and/or introductions; 3) develop a strategy to accomplish any additional collections which are determined to be needed; and 4) collect seeds as necessary if plants are present in large enough numbers to allow collection without adversely affecting donor populations.

The goal and expected results were to place seed from 30-40 taxa into long-term conservation storage at RSA.

5. If the work in this grant was part of a larger undertaking with other components and funding, present a brief overview of the larger activity and the role of this project.

This project is a continuation of a project funded under a 2006 grant (E-2-P-31). When proposed in 2006, E-2-P-31 envisioned collection of seed from 50 species of critical conservation need. E-2-P-31 was scaled back due to state budget constraints and unfavorable climatic conditions. 36 species were prioritized for collection following criteria developed by the Department of Fish and Game (Department). The project did not achieve its goal of adding accessions of 36 taxa over the life of the project, although 37 accessions from 16 taxa were placed in long-term conservation storage.

This project continued work started under the 2006 project.

6. Describe how the objectives were met.

A total of 5 accessions were made during the last reporting period, which are summarized in the table below.

2011/2012 Accessions

Species	Common Name	Status	# Accessions	Location
<i>Astragalus albens</i>	Cushenbury milk-vetch	FE	1	San Bernardino Mountains; on south slopes above unnamed stream just north of Whiskey Springs, about 1/2 mile south of CNDDDB element occurrence 6 at Monarch Flats.
<i>Astragalus pycnostachyus</i> var. <i>lanosissimus</i>	Ventura marsh milk-vetch	SE/FE	1	Oxnard, northeast corner of West Fifth Street and Harbor Blvd. Population known as North Shore.
<i>Eriogonum kennedyi</i> var. <i>austromontanum</i>	Southern mountain buckwheat	FT	1	San Bernardino Mountains; north of Big Bear Lake, northwest Holcomb Valley northwest of Forest Service Road 3N12.
<i>Poa atropurpurea</i>	San Bernardino blue grass	FE	1	San Bernardino Mountains; north of Big Bear Lake, Belleville Meadow northeast of Holcomb Campground.
<i>Poa napensis</i>	Napa blue grass	SE/FE	1	3000 block of Myrtledale Road, 1.65 miles northwest of downtown Calistoga, near southwest corner with Tubbs Lane.

All accessions made during this project are summarized in the attached table. The overall goal of the project was to place seed from 30-40 taxa into long-term conservation storage at RSA. This goal was not met; however 26 accessions representing 15 taxa were placed in storage. Multiple accessions were made for several species in order to capture the genetic diversity of these species. Each accession generated an additional expense for the grant; thus multiple accessions per species decreased the number of species that could be represented.

7. Discuss differences between work anticipated in grant proposal and grant agreement and that actually carried out with Federal Aid grant funds; include differences between expected and actual costs.

The previous grant manager for this project attempted to merge this grant with a previous grant (E-2-P-31) and set up one payable contract for both grants. Unfortunately, the paperwork was not submitted, and most of the invoices for this grant were paid from Department funds rather than federal grant funds. A total of \$18,750 of the grant was used, and \$50,600 of Department funds was used to pay the invoices submitted by the grantee.

8. List any publications or in-house reports resulting from this work. N/A

California Department of Fish & Game

U.S. Fish and Wildlife Service: Endangered Species Act (Section-6) Grant-in-Aid Program

9. Name, title, phone number, and e-mail address of person compiling this report

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SEED ACCESSIONS – TRADITIONAL SECTION 6 GRANT F08AP00214 (E-2-P-32)

Scientific Name	Common Name	Status ¹	# of Accessions	Comments
<i>Arenaria ursina</i>	Big Bear Valley sandwort	FT	2	Collections from San Bernardino Mountains. Germination ranged from 62% – 100%.
<i>Astragalus albens</i>	Cushenbury milk-vetch	FE	1	Collection from CNDDDB EO 2 ² . Germination of treated seeds 100%; untreated seeds 20%.
<i>Astragalus pycnostachyus</i> var. <i>lanosissimus</i>	Ventura Marsh milk-vetch	FE/SE	1	Collection from CNDDDB EO 7. Germination 20% – 100% depending on treatment.
<i>Castilleja cinerea</i>	Ash-gray Indian paintbrush	FT	2	Endemic to the San Bernardino Mountains. Collections from the vicinity of EOs 21 and 22. Germination 0%.
<i>Ceanothus cyaneus</i>	Lakeside ceanothus	CRPR 1B.2	2	Collections from the vicinity of CNDDDB EO 1. Germination 2% - 18% depending on type of treatment.
<i>Erigeron parishii</i>	Parish's daisy	FT	1	Collection from San Bernardino Mountains. Germination 75%.
<i>Eriogonum cedrorum</i>	The Cedars buckwheat	CRPR 1B.3	2	Endemic to The Cedars in Sonoma County. Bulk sampled collections from two populations. Germination 16%. Estimated viability (% live seed) of each sample is greater than 95%.
<i>Eriogonum kennedyi</i> var. <i>austromontanum</i>	Southern mountain buckwheat	FT	1	Collection from CNDDDB EO 16. Germination 40%.
<i>Hesperocyparis</i> (=Cupressus) <i>stephensonii</i>	Cuyamaca cypress	CRPR 1B.1	1	Restricted to the southwest slopes of Cuyamaca Peak on gabbroic rock. Germination 9%.
<i>Physaria</i> (=Lesquerella) <i>kingii</i> ssp. <i>bernardina</i>	San Bernardino Mountains bladderpod	FE	2	Collections from San Bernardino Mountains. Due to limited quantity of seed, germination tests only conducted on one collection. Germination 28%.
<i>Poa atropurpurea</i>	San Bernardino blue grass	FE	2	Collections from CNDDDB EO 10 and near EO 2. Germination conducted on second accession. 56% germination.
<i>Poa napensis</i>	Napa blue grass	FE/SE	2	Two accessions from CNDDDB EO 1. Germination conducted on second accession. 100% germination.

Scientific Name	Common Name	Status ¹	# of Accessions	Comments
<i>Rorippa subumbellata</i>	Tahoe yellow cress	SE	5	Collections from several populations occurring around the margins of Lake Tahoe. Germination for each accession: 0%, 0%, 70%, 2%, 8%.
<i>Sidalcea pedata</i>	Bird-foot checkerbloom	FE/SE	1	Collection from CNDDDB EO 5. Due to small quantity of seed, no germination tests were conducted.
<i>Thelypodium stenopetalum</i>	Slender-petaled thelypodium	FE/SE	1	Collected from south side of Big Bear Lake in the San Bernardino Mountains. Germination 52%.

¹ **FE** = Federally Endangered; **FT** = Federally Threatened; **SE** = State Endangered; **ST** = State Threatened

CRPR 1B.1 = Plants rare, threatened, or endangered in California and elsewhere; seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)

CRPR 1B.2 = Plants rare, threatened, or endangered in California and elsewhere; fairly threatened in California (20-80% of occurrences threatened/moderate degree and immediacy of threat)

CRPR 1B.3 = Plants rare, threatened, or endangered in California and elsewhere; not very threatened in California (<20% of occurrences threatened/low degree and immediacy of threat or no current threats known).

² **CNDDDB EO** = California Natural Diversity Database Element Occurrence



SEED BANK COLLECTION REPORT

Arenaria ursina **CNDDDB EO# undetermined** Caryophyllaceae
(Bear Valley sandwort)

23252 ... SD wild collected in USA

United States: California: San Bernardino: San Bernardino Mountains: Eastern
ridgeline of Sugarloaf Mountain; 1.1 air mile northwest of Onyx peak. USGS
Quad: Onyx Peak. Forest. 9210 ft. 34.19719°N, 116.73845°W. Full sun; also
found with *Erigeron aphinactis*, *Linanthus pungens*, *Castilleja cineria*,
Astragalus leucolobus Duncan S. Bell 1642. 20 Jul 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4363	23252	2010	1B.1	FT	1413	50

Based on the quantity of seed and the number of individuals sampled this
collection **IS** considered sufficient to serve its intended purpose as a conservation
seed collection.

Arenaria ursina **CNDDDB EO# undetermined** Caryophyllaceae
(Bear Valley sandwort)

23294 ... SD wild collected in USA

United States: California: San Bernardino: San Bernardino Mountains: East of
Aspen Glen picnic area. USGS Quad: Big Bear Lake. Sierran/Cascade: pebble plain
forest. 6902 ft. 34.23585°N, 116.92575°W. CDFG funded bulk sampled
conservation seed collection; Federally listed as Threatened; CNPS listing 1B.2.
Also found with *Cordylanthus nevinii*, *Ivesia agryocoma* Christine Craig 1613. 24
Aug 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4396	23294	2010	1B.1	FT	2576	500

Based on the quantity of seed and the number of individuals sampled this
collection **IS** considered sufficient to serve its intended purpose as a conservation
seed collection.



The preceding table shows the quantity of filled sound seed that was extracted from the total number of seed received. Hollow, sterile, or parasitized seeds were removed using an air blower unit.

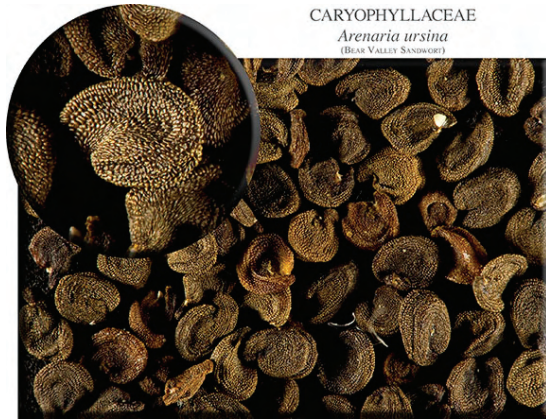


Photo of accession 17365 by John Macdonald 2009

CARYOPHYLLACEAE
Arenaria ursina
(BEAR VALLEY SANDWORT)

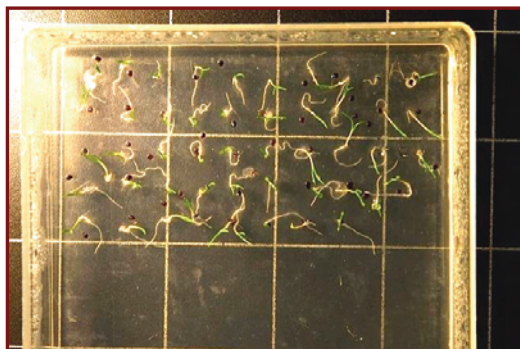
Viability (% pure live seed) is estimated to be greater than 95% based on a dissection exam where 5 of 5 of the lightest weight seeds are filled and sound.

These seeds were dried to equilibrium at 12% - 18% relative humidity. After three weeks the seeds were placed into heavy duty foil/plastic seed pouches, heat sealed, and placed into storage at -18° C.

Germination Test Results

Initial germination tests were conducted on 0.5% agar solution on clear plastic examination plates maintained at 11 hrs. light at 20° C and 13 hrs. dark at 12° C. Test results indicate that there is **no** dormancy in fresh seed under these test conditions.

LOT_NUM	ACC #	# TESTED	SEED TYPE	START DATE	END DATE	NUM GERM	% GERM	PRE TREATMENT	MISC
4363*1	23252	48	Fresh seed	14-Feb-11	23-Feb-11	48	100	No Treatment	all seedlings with very healthy root and cotyledon development
4396*1	23294	50	Fresh seed	1-Feb-11	22-Feb-11	31	62	Cold moist stratification; up to 14 days at 5° C	all seedlings with very healthy root and cotyledon development



1 March, 2011
Michael Wall – Seed Conservation Program Manager



SEED BANK COLLECTION REPORT

23486 *Astragalus albens*
(Cushenbury milkvetch)

CNDDDB EO# 2

Fabaceae

United States: California: San Bernardino: San Bernardino Mountains: Whiskey Springs on S slopes above unnamed stream just N of Whiskey Springs ca. ½ mile S of EO 6 at Monarch Flats. Californian: Pinion Juniper Woodland. 5136 34.337283°, 116.832716°. Funded CDFG maternal line sampled conservation seed collection; collection authorized under FWS permit TE009018-3. Christine Craig 1647. 29 Jun 2011

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	MATERNAL LINES
4985	23486	2011	1B.1	FE	173	20

Based on the quantity of seed and the number of individuals sampled this collection **is short** of the number of individuals as considered best practices to serve the collections intended purpose. However, depending on the genetic diversity between individuals within the population, this collection may be sufficient as it is.

Processing: Seed was received as fruits from each sampled plant in separate envelopes. Seeds were separated from the fruits by gentle threshing on a brass sieve. The threshed material was then blown to separate out the lighter weight chaff and any sterile or parasitized seed. Each seed sample was then placed into a separate glassine envelope. See number of seeds per individual work sheet.

The preceding seed lot table shows the quantity of filled sound seed that was extracted from the total quantity of plant material received. The estimated viability (% live seed) is greater than 95%.

Packaging: To prepare the seed for long term storage at -20° C the seed moisture content is reduced by allowing the seed to equilibrate at 12-15% RH using silica gel desiccant. After two weeks the seed is packaged in heavy duty foil plastic laminate heat sealed storage pouches, labeled, and placed into freezers.



Germination Test Results

Initial germination tests were conducted on 0.5% agar solution on clear plastic examination plates maintained at 11 hrs. light at 20° C and 13 hrs. dark at 12° C. Test results indicate that there is a simple seed coat dormancy in this seed lot that is over come by clipping through the seed coat.

LOT_NUM	ACC #	SEED TYPE	# TESTED	START_DT	END_DT	# GERM	% GERM	PRE TREATMENT	MISC
4985*2	23486	Fresh seed	5	13-Dec-11	10-Jan-12	5	100	Clip; rupture seed coat using pin, knife, or scalpel	All seedlings etiolated but with very healthy root and cotyledon development
4985*1	23486	Fresh seed	5	13-Dec-11	10-Jan-12	1	20	No Treatment	Seedling with very healthy root and cotyledon development



Seed image John Macdonald 2009

2 February, 2012

Michael Wall – Seed Conservation Program Manager



No. of seed per individual worksheet

Documentation Worksheet - No. of Seeds per Individual

Astragalus albens
23486

Date: 5 January, 2012

Plant #	Stor.	# Seeds	Wt.	Notes	Plant #	Stor.	# Seeds	Wt.	Notes	Plant #	Stor.	# Seeds	Wt.	Notes
23486 Active					23486Base					23486 Back up				
1		30	0.065		1		5	0.01		1				
2					2		5	0.015		2				
3					3		8	0.016		3				
4					4		7	0.014		4				
5					5		7	0.015		5				
6					6		3	0.005		6				
7					7		11	0.019		7				
8					8		6	0.014		8				
9					9		4	0.011		9				
10					10		4	0.010		10				
11					11		23	0.049		11				
12					12		4	0.007		12				
13					13		11	0.026		13				
14					14		5	0.008		14				
15					15		6	0.010		15				
16					16		7	0.019		16				
17					17		3	0.009		17				
18					18		7	0.017		18				
19					19		2	0.006		19				
20					20		15	0.031		20				
21					21					21				
				Total Fruits					Total Fruits					
		30	0.065	0			143	0.311	0			0	0.000	
Parents		TSD	TWT		Parents		TSD	TWT		Parents		TSD	TWT	
				173	Total Seeds					TSD	TWT			
				20	Total Parents					Active	30	0.065		
				0.376	Total Seed Weight					Base	143	0.311		
				0.217	Avg. 100 Seed Weight					Backup	0	0.000		
				#DIV/0!	Avg. viable seeds per fruit									



SEED BANK COLLECTION REPORT

23517 *Astragalus pycnostachyus* var. *lanosissimus*
(Ventura Marsh milkvetch) **CNDDDB EO# 7**

Fabaceae

United States: California: Ventura: Coastal Backdune: Oxnard, NE corner of West Fifth Street and Harbor Blvd. Population known as North Shore. Californian: Coastal dune. 29 ft. 34.19935°, 119.24048°. Funded maternal line conservation collection: Population roughly estimated at 100 juveniles and 32 reproductive individuals. Pods collected from 29. This original source population for all existing experimental populations has been on irrigation since June 2009 with the extra moisture having a dramatic effect on plant growth and reproductive output. Mary Meyer s.n. 8 Dec 2011.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	MATERNAL LINES
5000	23517	2011	1B.1	FE/SE	6,406	28

Based on the quantity of seed and the number of individuals sampled this collection **is** sufficient to serve the collections intended purpose.

Processing: Seed was received as fruits and partially processed seed samples with each sampled plant's seed in separate envelopes. To separate the seeds the fruits were gently threshed on a brass sieve. The threshed material was then blown to separate out the lighter weight chaff and any sterile or parasitized seed. Each seed sample was then placed into a separate glassine envelope. See number of seeds per individual work sheet.

The preceding seed lot table shows the quantity of filled sound seed that was extracted from the total quantity of plant material received. The estimated viability (% live seed) is greater than 95%. A small and variable percentage of each seed sample consisted of a different seed type which was duller in color, more brown than green, flatter in development, and rougher in surface texture. See seed photos and germination test results.

Packaging: To prepare the seed for long term storage at -20° C the seed moisture content is reduced by allowing the seed to equilibrate at 12-15% RH using silica gel desiccant. After two weeks the seed is packaged in heavy duty foil plastic laminate heat sealed storage pouches, labeled, and placed into freezers.



Germination Test Results

Initial germination tests were conducted on 0.5% agar solution on clear plastic examination plates maintained at 11 hrs. light at 20° C and 13 hrs. dark at 12° C. Test results indicate that there is a simple seed coat dormancy in this seed lot that is over come by clipping through the seed coat.

LOT_NUM	ACC #	SEED TYPE	# TESTED	START_DT	END_DT	# GERM	% GERM	PRE TREATMENT	MISC
5000*1	23517	Fresh seed	10	19-Jan-12	26-Jan-12	3	30	No Treatment	seedlings with healthy normal root development; remaining ungerminated seeds unimbibed
5000*2	23517	Fresh seed	15	19-Jan-12	26-Jan-12	15	100	Clip; rupture seed coat using pin, knife, or scalpel	all seedlings with very healthy root and cotyledon development
5000*3	23517	Fresh seed	10	19-Jan-12	26-Jan-12	2	20	No Treatment	Test on unusual seed morphs that have darker, thin walled, dull, buff colored, and sometimes moldy seed coats. **

** While some of this seed type are sterile or parasitized some are filled and viable. This test 2 of 10 seedlings with reduced vigor compared to 'normal' seeds with clipped seed coats. Ungerminated seeds 2 of 8 were empty while 6 of 8 contained mushy embryo and endosperm tissue.

15 February, 2012

Michael Wall – Seed Conservation Program Manager



Astragalus pycnostachyus
var. *lanosissimus*
(23517)

Date: 30 January

[illegible]



A



B



C

Germination test images (A & B) taken on 26 January, 2012. B image showing atypical seeds (*), typical seeds without treatment (NT), and typical seeds with clipping of seed coat pretreatment (CL). Image A is a close up cropping of NT and CL treatments. Image C taken on 14 February shows late germinants from NT normal seeds.



Seed imaging by John Macdonald, 2012 Rancho Santa Ana Botanic Garden



SEED BANK COLLECTION REPORT

9 March, 2011

Castilleja cineria

CNDDDB EO# 22

Orobanchaceae

(ash-gray paintbrush)

23297 ... SD wild collected in USA

United States: California: San Bernardino: San Bernardino Mountains: North of Big Bear Lake, W of Holcomb Valley, off 3N12 ca. 1/2 mile south of 3N16; ca. 0.3 miles west of CNDDDB EO#22. USGS Quad: Big Bear Lake. Sierran/Cascade: pebble plain forest. 7232 ft. 34.30432°N, 116.93025°W. CDFG funded bulk sampled conservation seed collection; Federally listed as Threatened; CNPS listing 1B.2. Gina Richmond SN. 31 Aug 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4400	23297	2010	1B.2	FT	8662	3

Based on the the number of individuals sampled this collection **IS NOT** considered sufficient to serve its intended purpose.

Castilleja cineria

CNDDDB EO# 21

Orobanchaceae

(ash-gray paintbrush)

23298 ... SD wild collected in USA

United States: California: San Bernardino: San Bernardino Mountains: Aspen Glen picnic area south of Big Bear Lake and northwest of Red Ant Canyon; ca. 1.25 miles northwest of EO#21. USGS Quad: Big Bear Lake. Sierran/Cascade: pebble plain forest. 6928 ft. 34.23636°N, 116.92464°W. CDFG funded bulk sampled conservation seed collection; Federally listed as Threatened; CNPS listing 1B.2. Also found with *Cordylanthus nevinii*, *Ivesia agryocoma* Gina Richmond SN. 31 Aug 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4401	23298	2010	1B.2	FT	30378	3

Based on the the number of individuals sampled this collection **IS NOT** considered sufficient to serve its intended purpose. We highly recommend augmenting this conservation collection with additional samples from this population.

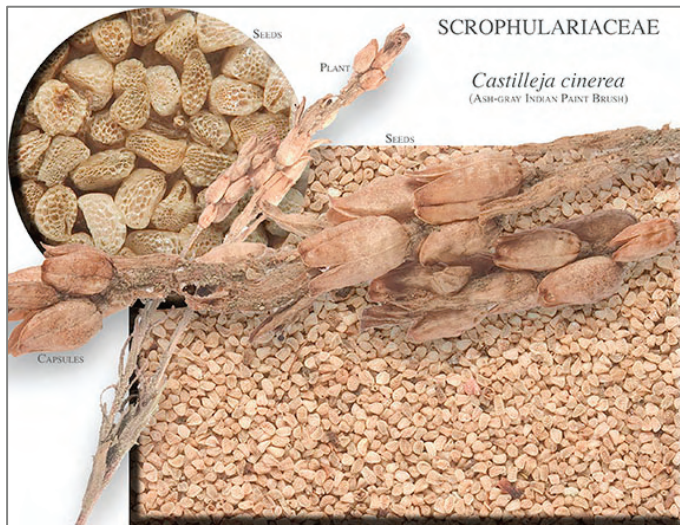


Photo by John Macdonald 2010

The preceding table shows the quantity of filled sound seed that was extracted from the total number of seed received. Hollow, sterile, or parasitized seeds were removed using an air blower unit. Viability (% pure live seed) is estimated to be greater than 95% based on a dissection exam where 5 of 5 of the lightest weight seeds are filled and sound.

These seeds were dried to equilibrium at 12% - 18%

relative humidity. After three weeks the seeds were placed into heavy duty foil/plastic seed pouches, heat sealed, and placed into storage at -18° C.

Germination Test Results

Initial germination tests were conducted on 0.5% agar solution on clear plastic examination plates maintained at 11 hrs. light at 20° C and 13 hrs. dark at 12° C. Test results indicate that there **is** dormancy in fresh seed that inhibits germination under these test conditions.

LOT_NUM	ACC #	# TESTED	SEED TYPE	START DATE	END DATE	NUM GERM	% GERM	PRE TREATMENT	MISC
4400*1	23297	50	Fresh seed	1-Feb-11	8-Mar-11	0	0	Alternating warm-cold-warm stratification; 14 - 90 day periods	Ungerminated seeds filled and sound within; moved plate to lab bench
4401*1	23298	97	Fresh seed	1-Feb-11	8-Mar-11	0	0	Alternating warm-cold-warm stratification; 14 - 90 day periods	Ungerminated seeds filled and sound within; moved plate to lab bench



SEED BANK COLLECTION REPORT

23225 *Ceanothus cyaneus* CNDDDB EO# (new occ.) Rhamnaceae
(San Diego *Ceanothus*)

23225 ... SD wild collected in USA

California: San Diego: Cuyamaca Mountains: Crestside Ecological Reserve; 17 miles NE of San Diego and SW of El Capitan Reservoir; 0.9 miles SW of CNDDDB EO#1. Californian: Chaparral. 1500 ft. 32.833422°, 116.833586°. Funded maternal line conservation seed collection; area burned in the 2003 Cedar Fire; plants recovering well although overall pop. size reduced from pre-fire extent; area receives some recreational use; primary threat is from another fire prior to the development of a soil seed bank; minor threats from trail impacts and invasive species. Patricia Gordon-Reedy SN. 16 Aug 2010.

23226 *Ceanothus cyaneus* CNDDDB EO# (new occ.) Rhamnaceae
(San Diego *Ceanothus*)

23226 ... SD wild collected in USA

California: San Diego: Cuyamaca Mountains: Crestside Ecological Reserve; 17 miles NE of San Diego and SW of El Capitan Reservoir; 1.75 miles SW of CNDDDB EO#1. Californian: Chaparral. 1400 ft. 32.833443°, 116.850063°. Funded maternal line conservation seed collection; plants on Cienega soils; most of the area burned in the 2003 Cedar Fire; plants 1-12 from unburned chaparral; area receives some recreational use; primary threat is from another fire prior to the development of a soil seed bank; minor threats from trail impacts and invasive species. Patricia Gordon-Reedy SN. 19 Aug 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4299	23225	2010	1B.2	none	52,387	50
4300	23226	2010	1B.2	none	26,526	30

Based on the quantity of seed and the number of individuals sampled these collections **are** considered sufficient to serve their intended purpose.



Active, Base, and Back-up storage units of accession 23225



These seed collections were received as maternal line samples collected from 80 plants in two populations at the Crestridge Ecological Reserve. The fruits were collected at an optimal period and there was a very high percentage of filled, sound, ripe seed. The preceding seed lot table above shows the quantity of filled sound seed that was extracted from the material received. The estimated viability (% live seed) of each sample is greater than 95%. Excellent collection.

From these two collections back-up collections of 8,000 seeds from ca. 80 parents will be stored at the USDA National Center for Genetic Resource Preservation in Ft. Collins, CO. See number of seed per individual worksheet.

These seed collections were dried to equilibrium at 12% relative humidity, packaged in heavy duty foil/plastic seed pouches, heat sealed, and placed into storage at -18° C.

Germination Test Results

Initial germination tests were conducted on 0.5% agar solution on clear plastic examination plates maintained at 11 hrs. light at 20° C and 13 hrs. dark at 12° C. Test results indicate that there **is** physical dormancy in a high percentage of fresh seed that inhibits germination.

LOT_NUM	ACC #	# TESTED	START_DT	END_DT	# GERM	% GERM	SEED TYPE	PRE TREATMENT	MISC
4299*1	23225	Fresh seed	14-Sep-10	6-Oct-10	20	2	10	NT	No Treatment
4299*2	23225	Fresh seed	14-Sep-10	6-Oct-10	20	12	60	SC	Scarification of seed coat using abrasive medium
4299*3	23225	Fresh seed	14-Sep-10	6-Oct-10	20	18	90	HW1	Boiled water; soak cooling 24 hrs.

Tests on accession 23226 are in process at this time.



Seed Photos by John Macdonald

6 October, 2010
Michael Wall – Seed Conservation Program Manager



SEED BANK COLLECTION REPORT

Erigeron parishii

CNDDDB new

Asteraceae

(Parrish's daisy)

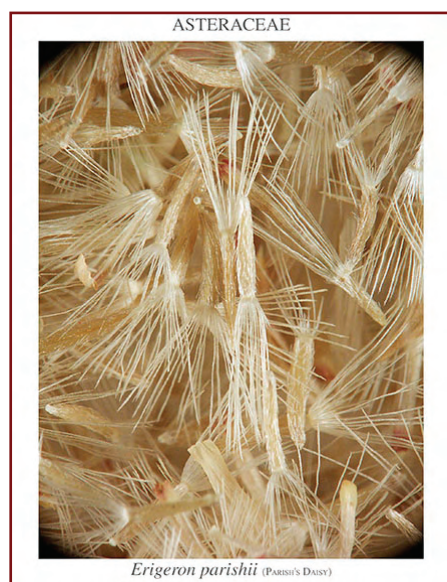
23300 ... SD wild collected in USA

United States: California: San Bernardino: San Bernardino Mountains: Cactus Flats, off Smart's Ranch Road ca. 0.9 mile south-southeast of junction with Hwy. 18 at the head of Lone Valley. USGS Quad: Big Bear City. Californian: Pinyon Juniper woodland. 6139 ft. 34.30428°N, 116.79949°W. CDFG funded bulk sampled conservation seed collection; population adjacent to off road vehicle use area; population within 1.0 mile of CNBBG EO #39; Federally listed as Threatened, CNPS listing 1B.1. Semi shade. Scott Eliason, CRAIG 1617. 27 Jul 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4412	23300	2010	1B.1	FT	781	10

Based on the quantity of seed and the number of individuals sampled this collection **IS NOT** considered sufficient to serve its intended purpose as a conservation seed collection.

The preceding table shows the quantity of filled sound seed that was extracted from the total number of seed received. Hollow, sterile, or parasitized seeds were removed using an air blower unit. Viability (% pure live seed) is estimated to be greater than 95% based on a dissection exam where 5 of 5 of the lightest weight seeds are filled and sound.



These seeds were dried to equilibrium at 12% - 18% relative humidity. After three weeks the seeds were placed into heavy duty foil/plastic seed pouches, heat sealed, and placed into storage at -18° C.

Photo of accession 20332 by John Macdonald 2008



Germination Test Results

Initial germination tests were conducted on 0.5% agar solution on clear plastic examination plates maintained at 11 hrs. light at 20° C and 13 hrs. dark at 12° C. Test results indicate that there is **no** dormancy in fresh seed under these test conditions.

LOT_NUM	ACC #	# TESTED	SEED TYPE	START DATE	END DATE	NUM GERM	% GERM	PRE TREATMENT	MISC
4412*1	23300	20	Fresh seed	1-Feb-11	9-Feb-11	15	75	No Treatment	15 of 20 seedlings with healthy root and cotyledon development; 3 of 5 with cotyledons but undeveloped roots; 2 of 5 seeds sterile

No test image

16 March, 2010

Michael Wall – Seed Conservation Program Manager



SEED BANK COLLECTION REPORT

23239 Eriogonum cedrorum CNDDDB EO# 1 Polygonaceae

(The Cedars buckwheat)

23239 ... SD wild collected in USA

United States: California: Sonoma: North Coast Ranges: The Cedars, headwaters of Big Austin Creek, main canyon at Upper Mine (type locality). USGS Quad: Fort Ross. Californian: talus barrens. 1240 ft. 38.621123°N, 123.1272001°W. Some pig damage each spring but not extensive. Historic mining on opposite side of creek (no Eriogonum there). Type locality for the taxon. Full sun; also found with Phacelia corymbosa, Eriogonum nudum var. auriculatum, Eriogonum luteolum, Epilobium minutum, Claytonia exigua, Claytonia gypsophiloides
Roger Raiche 047.10. 16 Sep 2010.

23239 Eriogonum cedrorum CNDDDB EO# (new) Polygonaceae

(The Cedars buckwheat)

23240 ... SD wild collected in USA

United States: California: Sonoma: North Coast Ranges: The Cedars, headwaters of Big Austin Creek, Azalea Creek drainage. USGS Quad: Fort Ross. Californian: talus barrens. 1257 ft. 38.611323°N, 123.125769°W. No disturbance, very few animals, more or less pristine. Full sun; also found with Streptanthus morrisonii, Phacelia corymbosa, Eriogonum nudum var. auriculatum, Eriogonum luteolum, Epilobium minutum, Claytonia exigua, Claytonia gypsophiloides
Roger Raiche 046.10. 16 Sep 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4311	23239	2010	1B		1188	seed - 150 individual(s)
4312	23240	2010	1B		2292	seed - 200 individual(s)

Based on the quantity of seed and the number of individuals sampled these collections **are** considered sufficient to serve their intended purpose.



These seed collections were received as bulk sampled collections from two populations. The fruits were harvested at an optimal period and there was a very high percentage of filled, sound, ripe seed. The preceding seed lot table above shows the quantity of filled sound seed that was extracted from the material received. The estimated viability (% live seed) of each sample is greater than 95%. Both collections while not large are very adequate and contain fully developed, sound seed. Excellent collections!

From these two collections back-up collections of 1,374 seeds were packaged separately and will be stored at the USDA National Center for Genetic Resource Preservation in Ft. Collins, CO. <http://www.ars.usda.gov/npa/ftcollins/ncgrp>

These seed collections were dried to equilibrium at 12% relative humidity, packaged in heavy duty foil/plastic seed pouches, heat sealed, and placed into storage at -18° C.

Germination Test Results

Initial germination tests were conducted on 0.5% agar solution on clear plastic examination plates maintained at 11 hrs. light at 20° C and 13 hrs. dark at 12° C. Test results indicate that there **is** possibly a chemical dormancy in a high percentage of fresh seed that inhibits germination. Germination is normal after excising the embryos from their seed coats. Test results on accession 23240 were identical.

LOT_NUM	ACC #	# TESTED	START_DT	END_DT	# GERM	% GERM	SEED TYPE	PRE TREATMENT	MISC
4311*1	23239	25	13-Oct-10	2-Dec-10	4	16	Fresh seed	No Treatment Cold Stratification Excise embryos	embryos excised from their seed coats (3) developed normally while the embryos remaining in their seed coats (2) failed to develop indicating a potent germination inhibitor within the seed coat which is likely nutralized with sufficient rainfall.



Germination test on November 29th above and on December 2 below showing development of excised embryos. In the figure below note seeds on the right which have been split but are still showing dormancy with little to no root or cotyledon development





Seed Photo by John Macdonald

6 December, 2010
Michael Wall – Seed Conservation Program Manager



SEED BANK COLLECTION REPORT

23495 *Eriogonum kennedyi* var. *austromontanum*
(southern mountain buckwheat) **CNDDB EO# 16**

Polygonaceae

United States: California: San Bernardino: San Bernardino Mountains: North of Big Bear Lake, NW Holcomb Valley NW of FS Road 3N12 . Vancouverian: pebble plain. 7224 ft. 34.306435°, 116.928675°. Maternal line conservation seed collection funded by CDFG; Collection authorized under FWS permit TE009018-3.. Christine Craig 1. 8 Sep 2011.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	MATERNAL LINES
4987	23495	2011	1B.2	FT	1,649	80

Based on the quantity of seed and the number of individuals sampled this collection **is** sufficient to serve the collections intended purpose.

Processing: Seed was received as maternal individual inflorescence samples with each plant sample in a separate envelope. To separate the seeds each inflorescence sample was gently threshed on a brass sieve. The threshed material was then blown to separate out the lighter weight chaff and sterile empty seed. Seed samples were then placed into separate glassine envelopes. See number of seeds per individual work sheet.

The preceding seed lot table shows the quantity of filled sound seed that was extracted from the total quantity of plant material received. The estimated viability (% live seed) is greater than 95%. However, see germination test results.

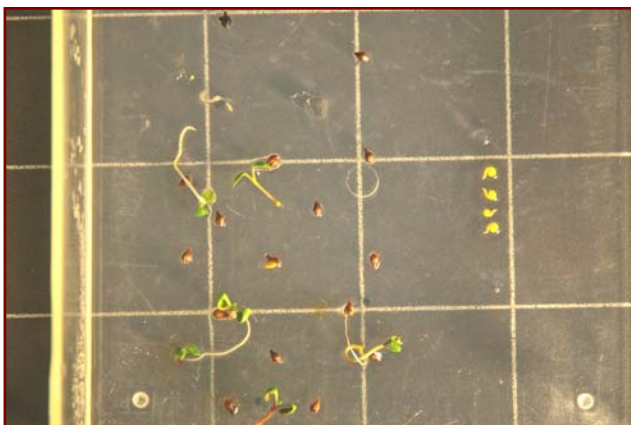
Packaging: To prepare the seed for long term storage at -20° C the seed moisture content is reduced by allowing the seed to equilibrate at 12-15% RH using silica gel desiccant. After two weeks the seed is packaged in heavy duty foil plastic laminate heat sealed storage pouches, labeled, and placed into freezers.



Germination Test Results

Initial germination tests were conducted on 0.5% agar solution on clear plastic examination plates maintained at 11 hrs. light at 20° C and 13 hrs. dark at 12° C. Seeds were started at ca. 70F then transferred to cold stratification (5 deg F) after two weeks. The variation in germination response, seedling vigor, and development indicate that there is (dormancy?) in this seed lot under these test conditions. Because of the poor and uneven germination response we recommend that future propagation should utilize a soil germination medium and possibly a cold stratification pretreatment period of at least 4 weeks.

LOT_NUM	ACC #	SEED TYPE	# TESTED	START_DT	END_DT	# GERM	% GERM	PRE TREATMENT	MISC
4987*1	23495	Fresh seed	25	2-Jan-12	14-Feb-12	10	40	Alternating warm-cold-warm stratification; 14 - 90 day periods	6 of 10 with normal root and cotyledon development (2 of 4 excised embryos); 4 of 10 abnormal without roots; ungerminated seeds filled and appearing healthy within.



Germination test seedlings taken on February 7 and February 14, 2012

15 February, 2012

Michael Wall – Seed Conservation Program Manager



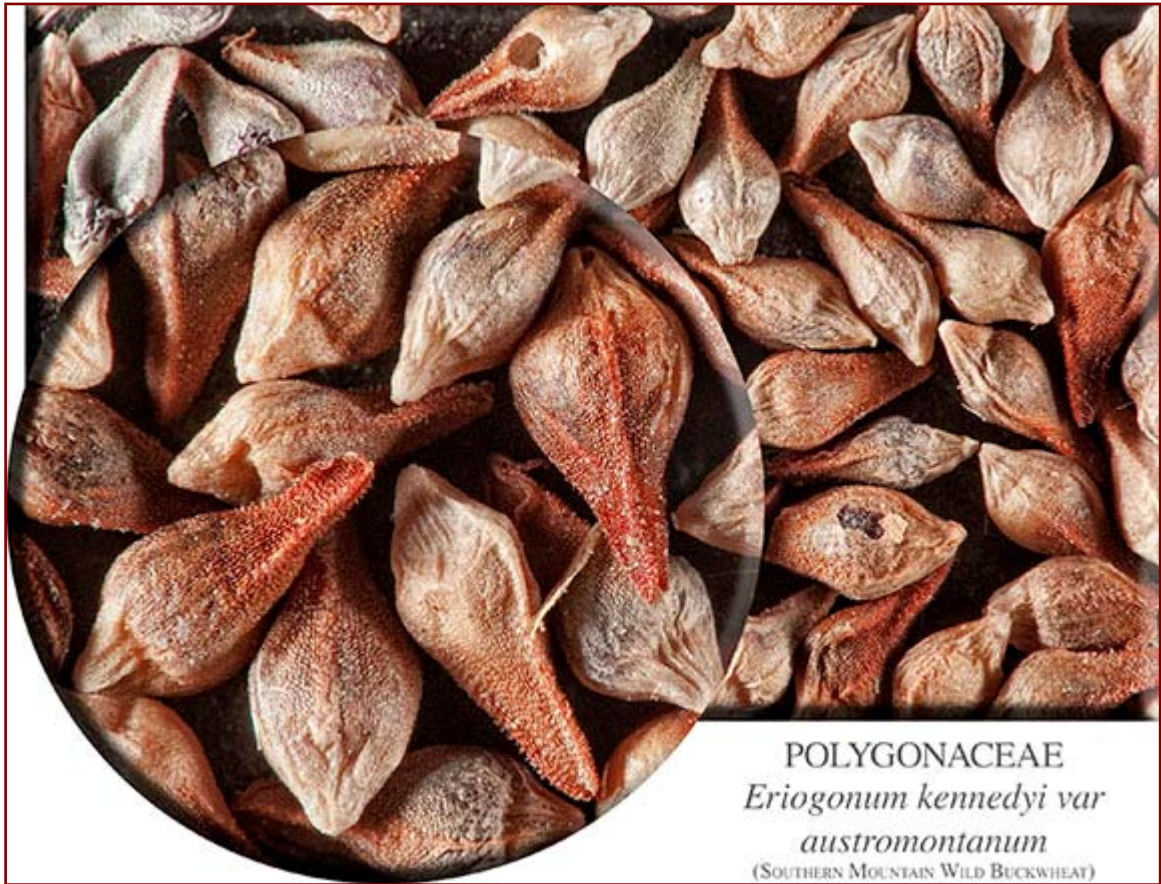
No. of seeds per individual worksheet

Documentation Worksheet - No. of Seeds per Individual

Eriogonum kennedyi var *austromontanum*
23495

Date: 10 February 2012

Plant #	Stor.	# Seeds	Wt.	Notes	Plant #	Stor.	# Seeds	Wt.	Notes	Plant #	Stor.	# Seeds	Wt.	Notes
23495 Active					23495 Base					23495 Back up				
1		32	0.031		1		34	0.043		1		6	0.009	Oct
2		30	0.042		2		17	0.021		2		16	0.029	Oct
3		25	0.034		3		19	0.022		3		18	0.022	Oct
4		38	0.050		4		21	0.025		4		22	0.037	Oct
5		20	0.023		5		20	0.025		5		6	0.008	Oct
6		40	0.050		6		58	0.025		6		3	0.003	Oct
7		20	0.029		7		17	0.028	Oct	7		6	0.009	Oct
8					8		17	0.017		8		9	0.012	Oct
9					9		10	0.013		9		27	0.048	
10					10		26	0.034	Oct	10		7	0.009	
11					11		41	0.065		11		13	0.018	
12					12		5	0.006		12		6	0.008	
13					13		12	0.017		13		20	0.023	
14					14		48	0.056		14		6	0.006	
15					15		5	0.005		15		22	0.029	
16					16		36	0.052		16		11	0.017	
17					17		28	0.043		17		9	0.011	
18					18		8	0.014	Oct	18		30	0.035	
19					19		52	0.074		19		14	0.017	
					20		29	0.042		20		19	0.028	
					21		41	0.059		21		5	0.005	
					22		27	0.043		22		5	0.005	
					23		9	0.012		23		9	0.015	
					24		25	0.035	Oct	24		22	0.026	
					25		38	0.046		25		10	0.012	
					26		8	0.013		26		10	0.013	
					27		55	0.065		27		12	0.011	
					28		20	0.024		28		29	0.033	
					29		25	0.034		29		10	0.012	
					30		14	0.021		30		4	0.005	
					31		33	0.039		31		16	0.018	
					32		8	0.010		32		3	0.004	
					33		35	0.046		33		28	0.046	
					34		28	0.038	Oct	34		17	0.023	
					35		24	0.027		35		17	0.019	
					36		43	0.055		36		9	0.011	
					37		32	0.041						
				Total Fruits					Total Fruits					Total Fruits
		205	0.259	0			968	1.235	0			476	0.627	
Parents		TSD	TWT		Parents		TSD	TWT		Parents		TSD	TWT	
		1,649	Total Seeds									TSD	TWT	
		80	Total Parents									Active	205	0.259
		2.121	Total Seed Weight									Base	968	1.235
		0.129	Avg. 100 Seed Weight									Backup	476	0.627
		#DIV/0!	Avg. viable seeds per fruit											



POLYGONACEAE
Eriogonum kennedyi var
austromontanum
(SOUTHERN MOUNTAIN WILD BUCKWHEAT)

Seed imaging by John Macdonald – Rancho Santa Ana Botanic Garden 2010



SEED BANK COLLECTION REPORT

25 August, 2010

23193 *Hesperocyparis stephensonii* **CNDDB EO# 1** Cupressaceae
(Cuyamaca cypress)

23193 ... SD wild collected in USA United States: California: San Diego: Southern Peninsular Range: Cuyamaca Mountains on the upper SW slopes of Cuyamaca Peak. USGS Quad Cuyamaca Mountain. Californian. 5602 ft. 32.942578°, 116.613571°. Maternal line conservation seed collection funded under state grant agreement No. P0685104. s.n. 20 Aug 2008.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	MATERNAL LINES
4284	23193	2008	1B.1	none	42,731	12

Based on the quantity of seed and the number of individuals sampled this collection **IS** considered sufficient to serve its intended purpose however the viability of each seed sample is low which reduces the quantity of seed available for reintroduction and the number of individuals represented could be higher.

The seeds were received from the Forest Service Placerville Seed Processing facility thoroughly cleaned and processed with an accompanying spreadsheet with seed weights, number of cones, results of seed fill rate as determined by x-ray, germination test results, and seed moisture content. As is typical with cypress these collections contained a high percentage of sterile aborted seeds. These are frequently filled with a dry, pithy, reddish tissue which makes separating them from the filled fertile seeds difficult. Higher viability can be achieved using a higher blower speeds to sort the seed lots but this would also result in a loss of some good seeds. Given the rarity and value of this collection we decided to keep the seed collections as they were received. For the 12 seed samples fill ratios or viability varied between <10% to a high of 34%.

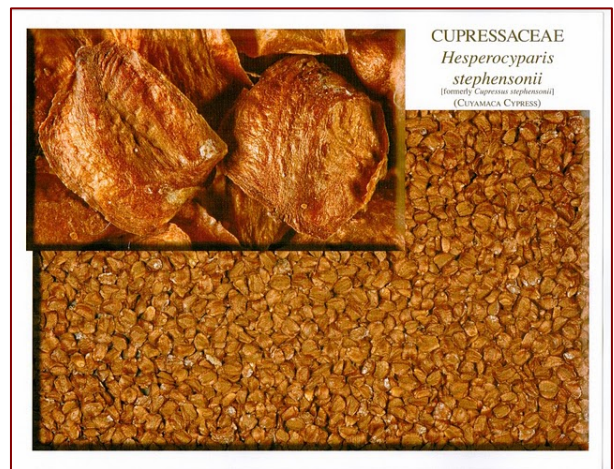


Photo by John Macdonald 2010

Each seed sample was repackaged and dried to equilibrium at 12% - 18% relative humidity. After three weeks the seeds were placed into heavy duty foil/plastic seed pouches, heat sealed, and placed into storage at -18° C.



Germination Test Results

Initial germination tests were conducted on 0.5% agar solution on clear plastic examination plates maintained at 11 hrs. light at 20° C and 13 hrs. dark at 12° C. Test results indicate that there is no seed dormancy in this seed lot under these test conditions. The following seed test image shows the healthy seedlings as well as the low percentage of viable seeds in this seed lot.

LOT_NUM	ACC #	# TESTED	START_DT	END_DT	# GERM	% GERM	SEED TYPE	PRE TREATMENT	MISC
4284*1	23193	100	27-Jul-10	17-Aug-10	9	9	Indoor stored seed	No Treatment	all seedlings with very healthy root and cotyledon development; ungerminated seeds 8 of 8 filled with dry reddish pithy tissue



25 August, 2010
Michael Wall – Seed Conservation Program Manager



SEED BANK COLLECTION REPORT
11 March, 2011

Physaria (Lesquerella) kingii ssp. bernardina
(San Bernardino Mountains bladderpod)

Brassicaceae

23292 ... SD wild collected in USA

United States: California: San Bernardino: San Bernardino Mountains: NE end of Big Bear Lake; Big Bear Gun Club off of W North Shore Drive west of Division Drive. USGS Quad: Big Bear Lake. Sierran/Cascade: scrub. 6816 ft. 34.266774°N, 116.866867°W. CDFG funded bulk sampled conservation seed collection; Semi shade Scott Eliason SN. 27 Jul 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4389	23292	2010	1B.1	FE	364	50

Based on the quantity of seed this collection **IS NOT** considered sufficient to serve its intended purpose as a conservation seed collection.

23310 ... SD wild collected in USA

United States: California: San Bernardino: San Bernardino Mountains: Southeast of Big Bear Lake on Sugarlump Mountain at top of Geronimo Run (Bear Mountain Ski Area). USGS Quad: Moonridge. Sierran/Cascade: Sub Alpine. 8782 ft. 34.210385°N, 116.85088°W. CDFG funded bulk sampled conservation seed collection; plants receive irrigation water from sprinklers on ski run; Full sun Krissy Day SN. 3 Aug 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4419	23310	2010	1B.1	FE	202	300

Based on the quantity of seed this collection **IS NOT** considered sufficient to serve its intended purpose as a conservation seed collection.



Photo of accession 16567 by John Macdonald 2008

The preceding table shows the quantity of filled sound seed that was extracted from the total number of seed received. Hollow, sterile, or parasitized seeds were removed using an air blower unit. Viability (% pure live seed) is estimated to be greater than 95% based on a dissection exam where 5 of 5 of the lightest weight seeds are filled and sound.

These seeds were dried to equilibrium at 12% - 18% relative humidity. After three weeks the

seeds were placed into heavy duty foil/plastic seed pouches, heat sealed, and placed into storage at -18° C.

Germination Test Results

Due to the limited quantity of seed germination tests were only conducted on one of the two collections.

Initial germination tests were conducted on 0.5% agar solution on clear plastic examination plates maintained at 11 hrs. light at 20° C and 13 hrs. dark at 12° C. Test results indicate that there **is** physical dormancy that inhibits germination in a percentage of fresh seed under these test conditions.

LOT_NUM	ACC #	# TESTED	SEED TYPE	START_DT	END_DT	# GERM	% GERM	PRE TREATMENT	MISC
4419*1	23310	25	Fresh seed	1-Feb-11	8-Mar-11	7	28	Cold moist stratification; indefinite period at 5° C	seedlings etiolated but with healthy root and cotyledon development

No image

11 March, 2011

Michael Wall – Curator and Seed Conservation Program Manager



SEED BANK COLLECTION REPORT

Poa atropurpurea

CNDDDB EO near EO#2

Poaceae

(San Bernardino bluegrass)

23313 ... SD wild collected in USA

United States: California: San Bernardino: San Bernardino Mountains: South side of Big Bear Lake; Eagle Point; north of Swan Road, south of Stone Bridge Road; west of Meadow View Drive. USGS Quad: Fawnskin. Sierran/Cascade: Forest meadow. 6779 ft. 34.24899°N, 116.89524°W. CDFG funded bulk sampled conservation seed collection; population ca. 0.3 miles west of CNDDDB EO #2; federally listed Endangered; CNPS listing 1B.2. Semi shade Scott Eliason CRAIG 1614. 27 Jul 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4392	23313	2010	1B.1	FE	38	3

Based on the quantity of seed and the number of individuals sampled this collection **IS NOT** considered sufficient to serve its intended purpose as a conservation seed collection.

The preceding table shows the quantity of filled sound seed that was extracted from the total number of seed received. Hollow, sterile, or parasitized seeds were



Photo of accession by John Macdonald

removed using an air blower unit. Viability (% pure live seed) is estimated to be greater than 95% based on a dissection exam where 5 of 5 of the lightest weight seeds are filled and sound.

These seeds were dried to equilibrium at 12% - 18% relative humidity. After three weeks the seeds were placed into heavy duty foil/plastic seed pouches, heat sealed, and placed into storage at -18° C.

Germination Test Results

Due to the small quantity of seed no germination tests were conducted on this collection.

17 February, 2010

Michael Wall – Seed Conservation Program Manager



SEED BANK COLLECTION REPORT

23496 *Poa atropurpurea*
(San Bernardino bluegrass)

CNDDDB EO# 10

Poaceae

United States: California: San Bernardino: San Bernardino Mountains: North of Big Bear Lake; Belleville Meadow NE of Holcomb Campground. Vancouverian: forest meadow. 7355 ft. 34.304385°, 116.889358°. Maternal line conservation seed collection funded by CDFG; Collection authorized under FWS permit TE009018-3. Christine Craig SBNF 1650. 11 Jul 2011.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	MATERNAL LINES
4988	23496	2011	1B.2	FE	1,055	26

Based on the quantity of seed and the number of individuals sampled this collection **is** sufficient to serve the collections intended purpose. There was not enough samples and seed to create a duplicate back up NCGRP collection.

Processing: Seed was received as maternal individual inflorescence samples with each plant sample in a separate envelope. To separate the seeds (florets) each inflorescence sample was gently threshed on a brass sieve. The threshed material was then blown to separate out the lighter weight chaff and sterile florets. Seed samples consisting of filled florets and extracted caryopsis were then placed into separate glassine envelopes. See number of seeds per individual work sheet.

The preceding seed lot table shows the quantity of filled sound seed that was extracted from the total quantity of plant material received. The estimated viability (% live seed) is greater than 95%. However, see germination test results.

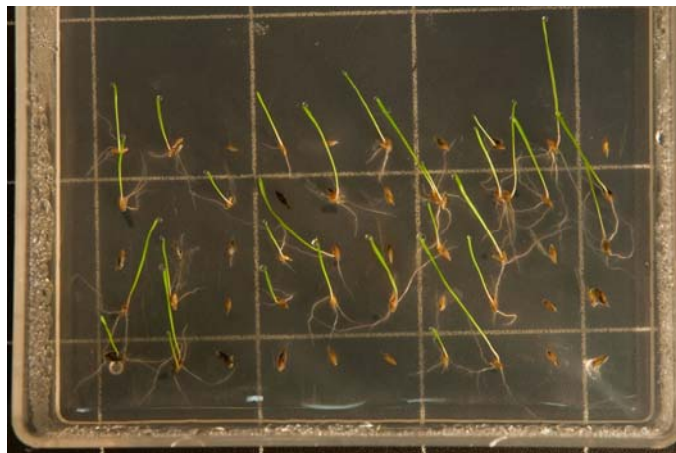
Packaging: To prepare the seed for long term storage at -20° C the seed moisture content is reduced by allowing the seed to equilibrate at 12-15% RH using silica gel desiccant. After two weeks the seed is packaged in heavy duty foil plastic laminate heat sealed storage pouches, labeled, and placed into freezers.



Germination Test Results

Initial germination tests were conducted on 0.5% agar solution on clear plastic examination plates maintained at 11 hrs. light at 20° C and 13 hrs. dark at 12° C. Test results indicate that there is no dormancy in this seed lot under these test conditions. However, there is some concern about the overall viability of a percentage of the seed as indicated by the poor state of the un-germinated caryopsis. It is a possibility that the seed that failed to germinate and rotted within the floret were immature.

LOT_NUM	ACC #	SEED TYPE	# TESTED	START_DT	END_DT	# GERM	% GERM	PRE TREATMENT	MISC
4988*1	23496	Fresh seed	50	9-Jan-12	7-Feb-12	28	56	Cold moist stratification; up to 14 days at 5° C	all seedlings with healthy root and cotyledon development; un-germinated seeds filled but soft and mushy within (immature seeds?)



Germination test seedlings taken on February 7, 2012

8 February, 2012

Michael Wall – Seed Conservation Program Manager



Seed imaging by John Macdonald - Rancho Santa Ana Botanic Garden 2012



SEED BANK COLLECTION REPORT

25 August, 2010

23200 *Poa napensis*
(Napa bluegrass)

CNDDB EO# 1

Poaceae

23200 ... SD wild collected in USA United States: California: Napa: 3000 block of Myrtledale Road, 1.65 miles NW of downtown Calistoga, near SW corner with Tubbs Lane. USGS Quad Calistoga. Californian: grassland. 400 ft. 38°35'46.04"N, 122°36'3.5"W. Site appeared to be ungrazed and had no other apparent ground disturbances. The house looked vacant. I collected from roadside as I called the landowner 5/08 and was not able to come on to the property itself to collect seed. The owner added the property is not for sale. Full sun; also found with teasel, non-native grasses. *Lepidium latifolium* across the road. One *Lepidium latifolium* inside fence, appears to be spreading. Kate Symonds s.n. 9 Jun 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4286	23200	2010	1B.1	FE/SE	16	4

Based on the quantity of seed and the number of individuals sampled this collection **IS NOT** considered sufficient to serve its intended purpose.

6 inflorescence stems were received in this collection. The very small quantity of seed from this collection was either due to very low seed set or much of the seed had already dispersed. The image on the right shows a typical inflorescence as received and all of the seeds that we were able to extract.

These seeds were dried to equilibrium at 12% - 18% relative humidity. After three weeks the seeds were placed into heavy duty foil/plastic seed pouches, heat sealed, and placed into storage at -18° C.



Photo by John Macdonald 2010

For these collections there was insufficient seed to run an initial germination test but viability and seed soundness is high. We highly recommend augmenting this conservation collection with additional samples from this population.

25 August, 2010

Michael Wall – Seed Conservation Program Manager



SEED BANK COLLECTION REPORT

Poa napensis
(Napa bluegrass)

CNDDDB EO# 1

Poaceae

23513 ... SD wild collected in USA

California: Napa: Inner North Coast Range: 3000 block of Myrtledale Road, 1.65 miles NW of downtown Calistoga, near SW corner with Tubbs Lane. Californian: Grassland. 400 ft. 38.596122°, 122.600972°. Population in poor condition. Property owned by a Rita Godward. Site continues to look abandoned with the one house looking derelict and abandoned. No grazing or other disturbances. Collection from roadside plants along the barbed wire property fence line. . Kate Symonds SN. 9 Jun 2011. Second maternal line seed collection made to augment the previous year's funded seed accession 23200.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4286	23200	2010	1B.1	FE/SE	16	4
4991	23513	2011	1B.1	FE/SE	6,630	14

Based on the quantity of seed and the number of individuals sampled this collection **is short** of the number of individuals as considered best practices to serve this collections intended purpose. However, depending on the genetic diversity between individuals within the population this collection with it's excellent quantity of seed may be sufficient as it is.

Processing: Seed was received with each population sample inflorescence in separate envelopes. To separate the florets from the inflorescences the floral material was gently threshed on a rubber mat. The florets were then blown to separate out the lighter weight sterile florets and any floral chaff.

The preceding seed lot table shows the quantity of filled sound seed that was extracted from the total quantity of plant material received. The estimated viability (% live seed) is greater than 95%.

Packaging: To prepare the seed for long term storage at -20° C the seed moisture content is reduced by allowing the seed to equilibrate at 12-15% RH using silica gel desiccant. After two weeks the seed is packaged in heavy duty foil plastic laminate heat sealed storage pouches, labeled, and placed into freezers.



Germination Test Results

Initial germination tests were conducted on 0.5% agar solution on clear plastic examination plates maintained at 11 hrs. light at 20° C and 13 hrs. dark at 12° C. Test seeds were surface sterilized with a 20% bleach and 1.0% Tween[®] solution prior to plating. Test results indicate that there is no dormancy in fresh seed when exposed to these test conditions.

LOT_NUM	ACC #	SEED TYPE	# TESTED	START_DT	END_DT	# GERM	% GERM	PRE TREATMENT	MISC
4991*1	23513	Fresh seed	50	3-Jan-12	26-Jan-12	50	100	Cold moist stratification; up to 14 days at 5° C	all seedlings with very healthy root and cotyledon development

Report prepared on:

1 February, 2011

Michael Wall, Seed Conservation Program Manager



No. of seed per individual worksheet

Plant #	Stor.	# Seeds	Wt.	Notes	Plant #	Stor.	# Seeds	Wt.	Notes	Plant #	Stor.	# Seeds	Wt.	Notes
23513 Active					23513 Base					23513 Back up				
1		200	0.082		1		261	0.094		1		7	0.001	
2					2		247	0.092		2		33	0.009	
3					3		189	0.066		3		115	0.033	
4					4		211	0.068		4		161	0.054	
5					5		33	0.01		5		109	0.036	
6					6		7	0.001		6		11	0.003	
7					7		317	0.111		7		197	0.072	
8					8		96	0.028		8		96	0.028	
9					9		110	0.036		9		188	0.065	
10					10		116	0.033		10		62	0.072	
11					11		10	0.002		11		212	0.068	
12					12		37	0.009		12		266	0.088	
13					13		161	0.072		13		37	0.009	
14					14		71	0.135		14		70	0.013	
15					15					15				
16					16					16				
17					17					17				
18					18					18				
19					19					19				
		200	0.082	0			1866	0.757	0			1564	0.550	
Parents		TSD	TWT		Parents		TSD	TWT		Parents		TSD	TWT	

3,630	Total Seeds	
14	Total Parents	
1.389	Total Seed Weight	
0.038	Avg. 100 Seed Weight	
#DIV/0!	Avg. viable seeds per fruit	

	TSD	TWT
Active	200	0.082
Base	1866	0.757
Backup	1564	0.550



Seed imaging by John Macdonald, RSABG © 2011



Seed Storage Report Form and Germination Test Worksheet

Accession # 23513

Endangerment Status: CNPS 10.1 STATE FED 16 SE GLOBAL G Big-hat Germplasm Lot # 4991

Species: *Poa napensis*

Date collected: 9-Jun-11 Date stored: 9-12-12

Quantity of seeds: 3,430

Wt. of 200 seeds: 0.082g

Wt. of all seeds: 1.387g

Examination/Repackaging Date: 2-Jan-12

Total containers and type: 3K424

Distribution of seed (Req. No. and quantity):

Collection Type: Bulk ☒ Maternal Lines ☒ Funded ☒ CPC ☒ Other ☐ (temporary storage or contract collection)

Packaging: qty weight Active: 300 0.082g Base: 1846 0.757g Back up: 1544 0.550g

GERMINATION TEST

MATERIAL TYPE: FRESH ☒ FROZEN ☐ COLD STORAGE ☐ ROOM STORAGE ☐ OTHER ☐

MEDIUM: AGAR ☒ SOIL ☐ GERMINATION PAPER ☐ OTHER ☐

ENVIRONMENT: G1 ☐ G2 ☐ G3 ☐ OTHER: STERILANT: BLT ☐ OTHER: ☐

PRETREATMENT: NT ☐ CS1 ☐ CS2 ☐ ALTS ☐ HW1 ☐ HW2 ☐ OTHER: ☐

START DATE: 3-Jan-12 NUMBER OF SEEDS IN TEST: 50

DATE: 17-Jan-12 # GERM: 23 NOTES: 30 G1 NUMBER OF SEEDS GERMINATED: 23

Rancho Santa Ana Botanic Garden at Claremont
23513 *Poa napensis*
2011 Maternal Line Sampled Conservation Collection
Active: ☒ Base: ☐ Backup: ☐
Total Seed: 200
Total Weight: 0.082g

Rancho Santa Ana Botanic Garden at Claremont
23513 *Poa napensis*
2011 Maternal Line Sampled Conservation Collection
Active: ☐ Base: ☒ Backup: ☐
Total Seed: 1,866
Total Weight: 0.757g

Rancho Santa Ana Botanic Garden at Claremont
23513 *Poa napensis*
2011 Maternal Line Sampled Conservation Collection
Active: ☐ Base: ☐ Backup: ☒
Total Seed: 1,564
Total Weight: 0.550g

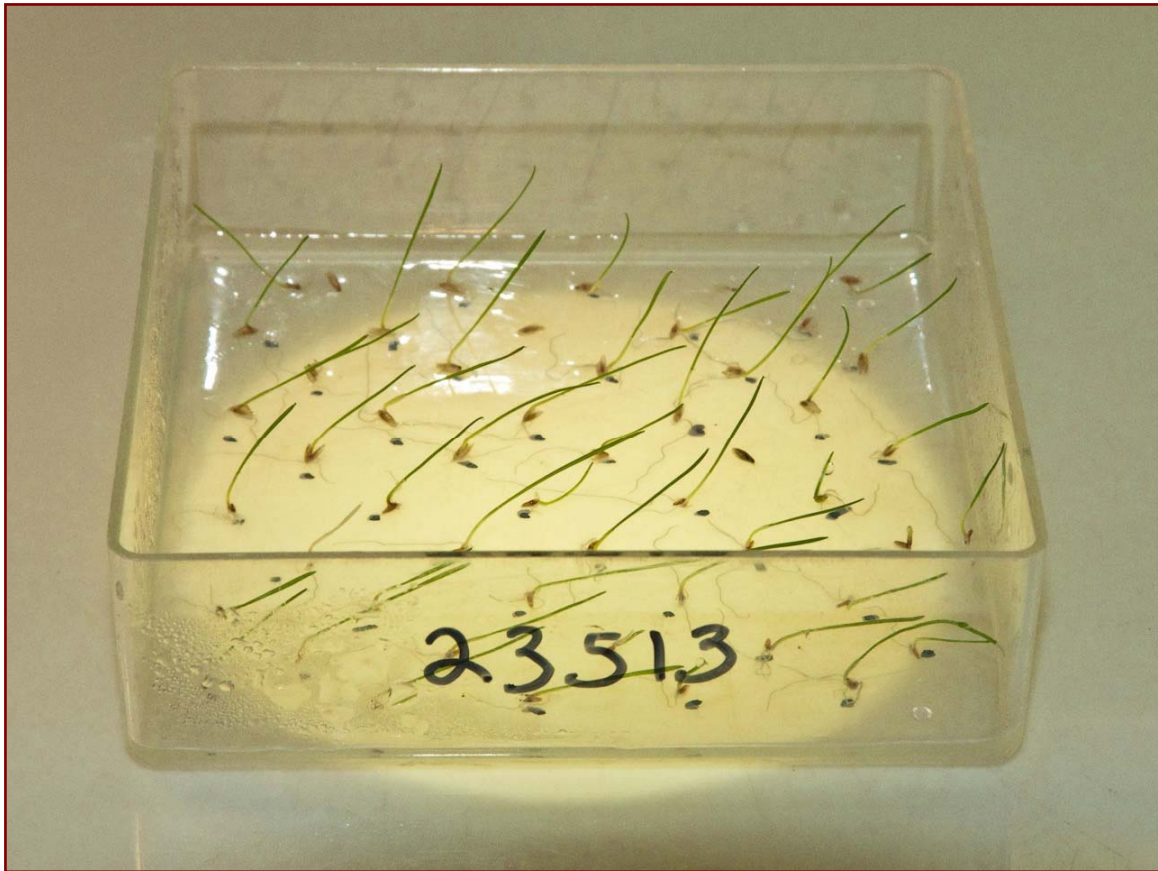
U.S. Fish & Wildlife Service
Kate Symonds
Fish & Wildlife Biologist
Partners for Fish & Wildlife
Department of the Interior
777 Sacramento Avenue, Room 325
Santa Rosa, CA 95404-6515
707/528-5515
707/528-3435 Fax
kate.symonds@fws.gov

Rancho Santa Ana Botanic Garden
Collection Date: 9-Jun-11 Received Date: 7-Dec-2011
Species Name: *Poa napensis*
Collector Name: Kate Symonds (DFG MOU 20181 (a) -09-04) Collection #: 23513
Associate Collectors:
Voucher? No ☒ Yes ☐ Location of voucher:
Country: State: CA County: Napa
Jepson Geographic Subregion: Inner North Coast Range Elevation: 400 FT. ☒ M. ☐
Locality: 3000 block of Myrtle Road, 1.65 miles NW of downtown Calistoga, near SW corner with Tubbs Lane
CNDBB EOW: 1 Landowner: Private
Latitude: N 38.596122 Longitude: W 122.600972 NAD83 ☐ NAD27 ☐ WGS84 ☐
Map Quad: T R SEC. 14 S.
Sampled population size: unknown
Number of individuals sampled: 14
Seed ☒ Spore ☐ Cutting ☐
Locality: common ☐ scattered ☐ rare ☒
Associated species: non-native grasses, *Dipsacus*, *Juncus* sp.
Plant ☐ Bulb/Corr ☐
Floristic Province: Californian ☒ Sonoran ☐
Great Basin ☐ Vancouverian ☐
Habitat: Alpine ☐ Chaparral ☐ Slope: ☐ Exposure: ☒ Moisture: ☐
Sub Alpine ☐ Scrub ☐ Flat ☒ Full sun ☒ Dry ☐
Forest ☐ Riparian ☐ Gentle ☐ Semi shade ☐ Moist ☐
Woodland ☐ Type: ☐ Cliff ☐ Shade ☐ Wet ☐
Grassland ☒ e.g. lodgepole pine forest ☐ Aspect ☐ Seasonally ☒ Moist ☐
Geology: Gabbro ☐ Shale ☐ Sand ☐ Clay ☐
Granite ☐ Volcanic ☐ Gravel ☐ Humus ☐
Limestone ☐ Serpentine ☐ Rock ☐ Alluvium ☐
Sandstone ☐ Other: ☒ Loam ☐ Other: ☐
Collector notes and observations:
Population in poor condition. Property owned by a Rita Godward. Site continues to look abandoned with the one house looking derelict and abandoned. No grazing or other disturbances. Collection from roadside plants along the barbed wire property fence line.

Poa napensis
23513
Documentation Worksheet - No. of Seeds per Individual
Date: 24 January 2012

Plant #	Size	# Seeds	WT	Notes	Plant #	Size	# Seeds	WT	Notes	Plant #	Size	# Seeds	WT	Notes	Plant #	Size	# Seeds	WT	Notes
1	200	0.082			1	200	0.082			1	200	0.082			1	200	0.082		
2	200	0.082			2	200	0.082			2	200	0.082			2	200	0.082		
3	200	0.082			3	200	0.082			3	200	0.082			3	200	0.082		
4	200	0.082			4	200	0.082			4	200	0.082			4	200	0.082		
5	200	0.082			5	200	0.082			5	200	0.082			5	200	0.082		
6	200	0.082			6	200	0.082			6	200	0.082			6	200	0.082		
7	200	0.082			7	200	0.082			7	200	0.082			7	200	0.082		
8	200	0.082			8	200	0.082			8	200	0.082			8	200	0.082		
9	200	0.082			9	200	0.082			9	200	0.082			9	200	0.082		
10	200	0.082			10	200	0.082			10	200	0.082			10	200	0.082		
11	200	0.082			11	200	0.082			11	200	0.082			11	200	0.082		
12	200	0.082			12	200	0.082			12	200	0.082			12	200	0.082		
13	200	0.082			13	200	0.082			13	200	0.082			13	200	0.082		
14	200	0.082			14	200	0.082			14	200	0.082			14	200	0.082		
15	200	0.082			15	200	0.082			15	200	0.082			15	200	0.082		
16	200	0.082			16	200	0.082			16	200	0.082			16	200	0.082		
17	200	0.082			17	200	0.082			17	200	0.082			17	200	0.082		
18	200	0.082			18	200	0.082			18	200	0.082			18	200	0.082		
19	200	0.082			19	200	0.082			19	200	0.082			19	200	0.082		
20	200	0.082			20	200	0.082			20	200	0.082			20	200	0.082		
21	200	0.082			21	200	0.082			21	200	0.082			21	200	0.082		
22	200	0.082			22	200	0.082			22	200	0.082			22	200	0.082		
23	200	0.082			23	200	0.082			23	200	0.082			23	200	0.082		
24	200	0.082			24	200	0.082			24	200	0.082			24	200	0.082		
25	200	0.082			25	200	0.082			25	200	0.082			25	200	0.082		
26	200	0.082			26	200	0.082			26	200	0.082			26	200	0.082		
27	200	0.082			27	200	0.082			27	200	0.082			27	200	0.082		
28	200	0.082			28	200	0.082			28	200	0.082			28	200	0.082		
29	200	0.082			29	200	0.082			29	200	0.082			29	200	0.082		
30	200	0.082			30	200	0.082			30	200	0.082			30	200	0.082		
31	200	0.082			31	200	0.082			31	200	0.082			31	200	0.082		
32	200	0.082			32	200	0.082			32	200	0.082			32	200	0.082		
33	200	0.082			33	200	0.082			33	200	0.082			33	200	0.082		
34	200	0.082			34	200	0.082			34	200	0.082			34	200	0.082		
35	200	0.082			35	200	0.082			35	200	0.082			35	200	0.082		
36	200	0.082			36	200	0.082			36	200	0.082			36	200	0.082		
37	200	0.082			37	200	0.082			37	200	0.082			37	200	0.082		
38	200	0.082			38	200	0.082			38	200	0.082			38	200	0.082		
39	200	0.082			39	200	0.082			39	200	0.082			39	200	0.082		
40	200	0.082			40	200	0.082			40	200	0.082			40	200	0.082		
41	200	0.082			41	200	0.082			41	200	0.082			41	200	0.082		
42	200	0.082			42	200	0.082			42	200	0.082			42	200	0.082		
43	200	0.082			43	200	0.082			43	200	0.082			43	200	0.082		
44	200	0.082			44	200	0.082			44	200	0.082			44	200	0.082		
45	200	0.082			45	200	0.082			45	200	0.082			45	200	0.082		
46	200	0.082			46	200	0.082			46	200	0.082			46	200	0.082		
47	200	0.082			47	200	0.082			47	200	0.082			47	200	0.082		
48	200	0.082			48	200	0.082			48	200	0.082			48	200	0.082		
49	200	0.082			49	200	0.082			49	200	0.082			49	200	0.082		
50	200	0.082			50	200	0.082			50	200	0.082			50	200	0.082		
Total	200	0.082			Total	200	0.082			Total	200	0.082			Total	200	0.082		
Parents	150	0.062			Parents	150	0.062			Parents	150	0.062			Parents	150	0.062		
Backups	50	0.020			Backups	50	0.020			Backups	50	0.020			Backups	50	0.020		
Total	200	0.082			Total	200	0.082			Total	200	0.082			Total	200	0.082		
Active	150	0.062			Active	150	0.062			Active	150	0.062			Active	150	0.062		
Base	50	0.020			Base	50	0.020			Base	50	0.020			Base	50	0.020		
Backup	50	0.020			Backup	50	0.020			Backup	50	0.020			Backup	50	0.020		

Seed packaging RSABG 2011



Initial germination test seedlings



SEED BANK COLLECTION REPORT

March 7, 2011

Accession information

Rorippa subumbellata
(Lake Tahoe yellowcress)

Brassicaceae

23314 ... SD wild collected in United States

United States: California: El Dorado: Northern Sierra Nevada High: Lake Tahoe;
Blackwood Creek South, west shore south of Truckee River and Tahoe City CNDDB EO#
19. USGS Quad: South Lake Tahoe. Sierran/Cascade: Back beach. 6068 ft. 39.104897°N,
120.15959°W. Sampled population was stems; plants are clonal, stem counts are from
2009 census; CDFG funded maternal line sampled conservation seed collection. Semi
shade Cheryl Beyer s.n. 17 Sep 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4408	23314	2010	1B.1	SE	10,760	11

Based on the number of individuals sampled this collection **IS NOT** considered sufficient to serve its intended purpose. However considering the many other samples from nearby populations this may not be a matter of concern.

23315 ... SD wild collected in United States

United States: Nevada: Douglas: Northern Sierra Nevada High: Lake Tahoe, Nevada
Beach; ca. 0.75 miles north of CNDDB EO#1 (Edgewood Golfcourse) USGS Quad: South
Lake Tahoe. Sierran/Cascade: Riparian forest at lake side beach. 6190 ft. 38.97667°N,
119.95193°W. Sampled population was stems; plants are clonal, stem counts are from
2009 census; CDFG funded maternal line sampled conservation seed collection.
Semi shade Cheryl Beyer s.n. 14 Sep 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4603	23315	2010	1B.1	SE	8,065	4

Based on the quantity of seed and number of individuals sampled this collection **IS NOT** considered sufficient to serve its intended purpose. However considering the many other samples from nearby populations this may not be a matter of concern.



23316 ... SD wild collected in United States United States: California: El Dorado: Northern Sierra Nevada High: Lake Tahoe; Tahoe Keys just west of the town of South Lake Tahoe; 0.5 miles west of CNDDDB EO#5 and 0.5 miles east of EO#9. USGS Quad: South Lake Tahoe. Sierran/Cascade: Riparian, back beach. 6068 ft. 38.93878°N, 120.00754°W. Sampled population was stems; plants are clonal, stem counts are from 2009 census; CDFG funded maternal line sampled conservation seed collection. Semi shade; also found with small willow seedlings Cheryl Beyer s.n. 17 Sep 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4410	23316	2010	1B.1	SE	26,992	21

Based on the quantity of seed and number of individuals sampled this collection **IS NOT** considered sufficient to serve its intended purpose. However considering the many other samples from nearby populations this may not be a matter of concern.

23317 ... SD wild collected in United States
United States: California: El Dorado: Northern Sierra Nevada High: Lake Tahoe; Taylor Creek East; east-southeast of Emerald Bay USGS Quad: South Lake Tahoe.
Sierran/Cascade: Riparian; lake side beach. 6222 ft. 38.940881°N, 120.05861°W.
Sampled population was stems; plants are clonal, stem counts are from 2009 census of Taylor Creek East and West populations; CDFG funded maternal line sampled conservation seed collection. Semi shade Cheryl Beyer s.n. 15 Sep 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4411	23317	2010	1B.1	SE	33,453	75

Based on the quantity of seed and number of individuals sampled this collection **IS** considered sufficient to serve its intended purpose.

23318 ... SD wild collected in United States
United States: California: El Dorado: Northern Sierra Nevada High: Lake Tahoe; Upper Truckee River East at inlet to Lake; ca. 0.75 miles north of CNDDDB EO#1 (Edgewood Golfcourse) USGS Quad: South Lake Tahoe. Sierran/Cascade: Jeffrey Pine forest. 6218 ft. 38.9421901°N, 119.99574°W. Sampled population was stems; plants are clonal; stem counts are from 2009 census; CDFG funded maternal line sampled conservation seed collection. Semi shade Cheryl Beyer s.n. 14 Sep 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4409	23318	2010	1B.1	SE	31,770	23

Based on the quantity of seed and number of individuals sampled this collection **IS NOT** considered sufficient to serve its intended purpose. However considering



the many other samples from nearby populations this may not be a matter of concern.

Processing and collection quality assessment

These *Rorippa* seed collections were received as several population samples from populations occurring around the margins of the lake. According to documentation received each sample represented one plant's seed but given that the plants are clonal this is only an estimate as being genetically unique. Each sample was received in a separate manila coin envelope and was well labeled as to population, collection date, and collector's names. Each seed sample was processed by rubbing the fruits (siliques) off of the heads and threshing to separate the seeds from their fruits. An air separation blower unit was then used to separate out any chaff and lighter weight hollow or aborted seeds. The number of filled viable seeds per individual is noted in the preceding figure. Each of the maternal samples was placed into individual glassine envelopes and stored to equilibrium at 12% relative humidity. Each accession was split into a Base and an Active storage unit and one accession (23317) provided the backup collection sample that will be sent to the USDA National Center for Genetic Resource Preservation in Ft. Collins, Co. See the enclosed No. of Individuals Worksheets for each accession.

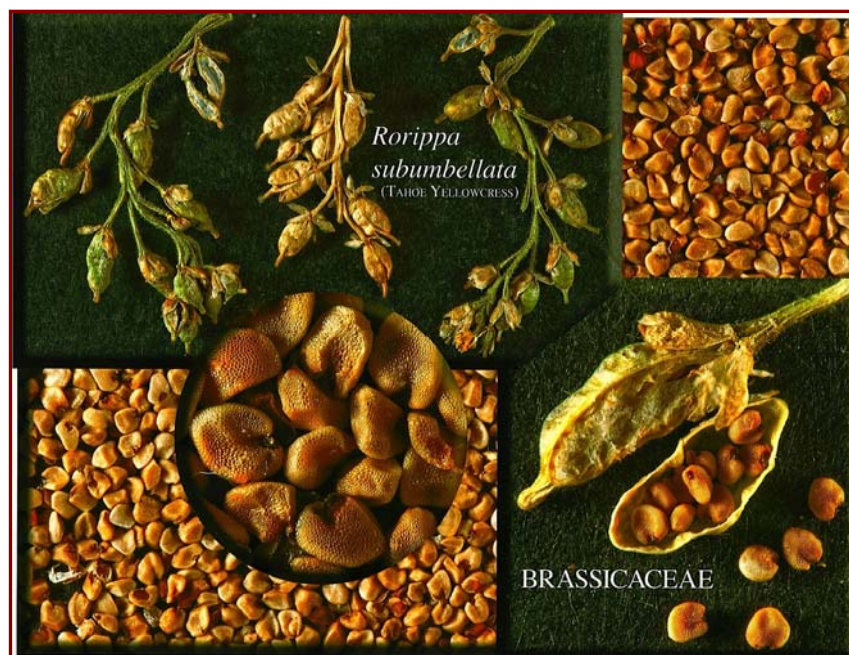


Fig. 1 Seed image by John Macdonald 2011



Germination test results

Initial germination tests were conducted on 0.5% agar solution on clear plastic examination plates maintained at 11 hrs. light at 20° C and 13 hrs. dark at 12° C. Test results indicate that there **is dormancy** in fresh seed that restricts germination. Several pre-treatments were applied with the five accessions including: cold stratification (CS); water soak (WS) no treatment (NT) There was no germination response in any of the treatments until a layer of deionized water was placed over the seed of accession 23316. This water gradually was absorbed over a three week period and by 8 March 70% of the seeds had initiated germination. In addition germination was also initiated by excising embryos from their seed coats. Removal of the outer seed coat had no effect. Both positive results indicate that germination inhibitors within the seed coat may play a role in controlling germination events.

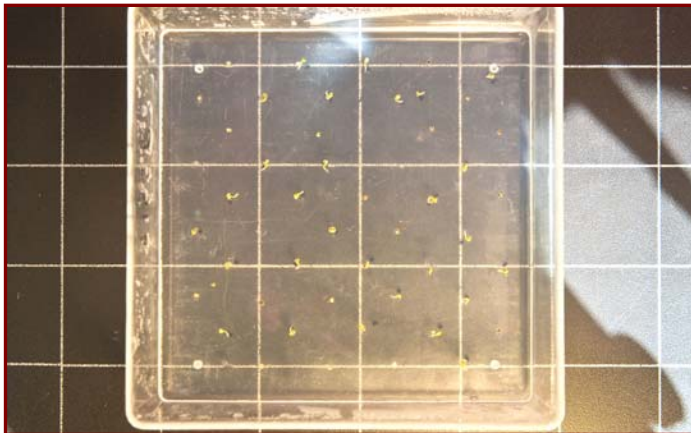


Fig. 2 Accession 23316 showing early seedlings

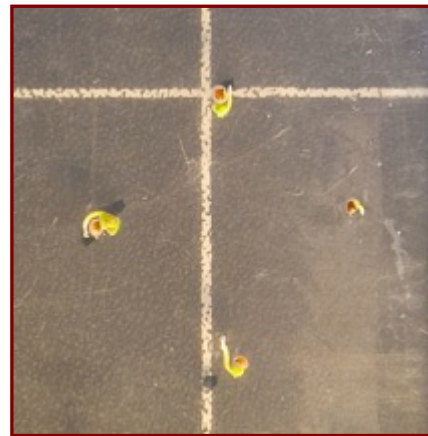


Fig. 3 close up of germinating seeds



LOT_NUM	ACC #	# TESTED	SEED TYPE	START_DT	END_DT	# GERM	% GERM	PRE TREATMENT	MISC
4408*1	23314	50	Fresh seed	1-Feb-11	9-Mar-11	0	0	Cold moist stratification; up to 14 days at 5° C	ungerminated seeds filled within and imbibed; some mold on plate and seeds
4603*1	23315	50	Fresh seed	1-Feb-11	9-Mar-11	0	0	No Treatment	Plate left open 28FEB and agar dried out; ungerminated seeds appearing filled, sound and viable
4410*1	23316	50	Fresh seed	1-Feb-11	9-Mar-11	35	70	No Treatment; seed covered with water on 15FEB	seedlings with early cotyledons and just developing roots on 8MAR, 2011
4411*1	23317	51	Fresh seed	1-Feb-11	9-Mar-11	1	2	Water soak prior to sowing	one seedling with very healthy root and cotyledons; ungerminated seeds filled within and imbibed;
4409*1	23318	49	Fresh seed	1-Feb-11	9-Mar-11	4	8	Cold moist stratification; up to 14 days at 5° C; remove outer seed coat; Excise embryos	The only seeds to germinate were those embryos that were excised from the seed; no germination on other seeds with outer seed coats removed

Michael Wall – Curator and Seed Conservation Program Manager



Appedix 1.

Documentation Worksheet - No. of Seeds per Individual

Date: 26 January, 2011

Rorippa subumbellata
23314

Plant #	Stor.	# Seeds	Wt.	Notes	Plant #	Stor.	# Seeds	Wt.	Notes	Plant #	Stor.	# Seeds	Wt.	Notes
23314 Active					23314 Base					23314 Back up				
1		250	0.030		1		392	0.047		1				
2					2		2858	0.344		2				
3					3		592	0.071		3				
4					4		1092	0.131		4				
5					5		2267	0.272		5				
6					6		450	0.054		6				
7					7		1292	0.155		7				
8					8		167	0.020		8				
9					9		142	0.017		9				
10					10		1258	0.163		10				
11					11					11				
12					12					12				
13					13					13				
14					14					14				
15					15					15				
16					16					16				
17					17					17				
18					18					18				
19					19					19				
				Total Fruits					Total Fruits					
		250	0.030	0			10510	1.274	0			0	0.000	
Parents		TSD	TWT		Parents		TSD	TWT		Parents		TSD	TWT	
				10,760										
				11										
				1.304					Active					
				0.012					Base					
				#DIV/0!					Backup					
				Avg. viable seeds per fruit										



Appedix 3.

Documentation Worksheet - No. of Seeds per Individual

Date: 26 January, 2011

Rorippa subumbellata
23316

Plant #	Stor.	# Seeds	Wt.	Notes	Plant #	Stor.	# Seeds	Wt.	Notes	Plant #	Stor.	# Seeds	Wt.	Notes
23316 Active					23316 Base					23316 Back up				
1		275	0.033		1		592	0.071		1				
2					2		2675	0.321		2				
3					3		1125	0.135		3				
4					4		3100	0.372		4				
5					5		367	0.044		5				
6					6		408	0.049		6				
7					7		1792	0.215		7				
8					8		367	0.044		8				
9					9		1492	0.179		9				
10					10		3475	0.417		10				
11					11		483	0.058		11				
12					12		282	0.035		12				
13					13		408	0.049		13				
14					14		3325	0.399		14				
15					15		2067	0.248		15				
16					16		717	0.086		16				
17					17		2100	0.252		17				
18					18		100	0.012		18				
19					19		1667	0.200		19				
20					20		175	0.021		20				
21					21					21				
22					22					22				
23					23					23				
				Total Fruits					Total Fruits					
Parents		275	0.033	0	Parents		26717	3.207	0	Parents		0	0.000	
Parents		TSD	TWT		Parents		TSD	TWT		Parents		TSD	TWT	
			26,992	Total Seeds						TSD		TWT		
			21	Total Parents					Active	275	0.033			
			3.240	Total Seed Weight					Base	26717	3.207			
			0.012	Avg. 100 Seed Weight					Backup	0	0.000			
			#DIV/0!	Avg. viable seeds per fruit										



Appedix 4.

Documentation Worksheet - No. of Seeds per Individual

Date: 26 January, 2011

Rorippa subumbellata
23317

Plant #	Stor.	# Seeds	Wt.	Notes	Plant #	Stor.	# Seeds	Wt.	Notes	Plant #	Stor.	# Seeds	Wt.	Notes
23317 Active					23317 Base					23317 Back up				
1		1476	0.310	west	1		176	0.037	west	1		214	0.045	west
2					2		348	0.073	east	2		1081	0.226	west
3					3		829	0.174	west	3		567	0.119	west
4					4		362	0.076	west	4		314	0.066	west
5					5		257	0.054	west	5		543	0.114	west
6					6		233	0.049	west	6		100	0.021	east
7					7		719	0.151	west	7		33	0.007	west
8					8		443	0.093	west	8		229	0.048	west
9					9		229	0.047	west	9		138	0.029	west
10					10		386	0.081	west	10		90	0.019	west
11					11		185	0.039	west	11		214	0.045	west
12					12		219	0.046	east	12		305	0.064	west
13					13		666	0.140	west	13		119	0.025	west
14					14		271	0.057	west	14		57	0.012	east
15					15		114	0.024	west	15		81	0.017	west
16					16		314	0.066	west	16		190	0.040	west
17					17		195	0.040	west	17		238	0.050	west
18					18		67	0.014	west	18		1157	0.243	east
19					19		352	0.074	west	19		23	0.005	west
20					20		557	0.117	west	20		238	0.050	west
21					21		610	0.128	west	21		452	0.095	west
22					22		1581	0.332	west	22		195	0.041	west
23					23		566	0.119	east	23		67	0.014	west
24					24		829	0.174	west	24		167	0.035	west
25					25		885	0.186	east	25		490	0.103	west
26					26		300	0.064	west	26		652	0.137	east
27					27		214	0.045	west	27		690	0.145	west
28					28		1490	0.313	west	28		561	0.118	west
29					29		247	0.052	west	29		133	0.028	west
30					30		204	0.043	west	30		377	0.073	west
31					31		238	0.050	west	31				
32					32		1547	0.325	east	32				
33					33		109	0.023	west	33				
34					34		409	0.086	east	34				
35					35		838	0.176	west	35				
36					36		1038	0.218	west	36				
37					37		61	0.013	west	37				
38					38		414	0.087	west	38				
39					39		314	0.066	west	39				
40					40		995	0.209	east	40				
41					41		128	0.027	west	41				
42					42		171	0.036	west	42				
43					43		238	0.050	west	43				
44					44		1619	0.340	west	44				
45					45		295	0.062	west	45				
		1476	0.310	0			22262	4.676	0			9715	1.989	
Parents		TSD	TWT		Parents		TSD	TWT		Parents		TSD	TWT	
		33,453	Total Seeds									TSD	TWT	
		76	Total Parents									1476	0.310	
		6.975	Total Seed Weight									Base	22262	4.676
		0.021	Avg. 100 Seed Weight									Backup	9715	1.989
		#DIV/0!	Avg. viable seeds per fruit											



Appedix 5.

Documentation Worksheet - No. of Seeds per Individual

Date: 26 January, 2011

Rorippa subumbellata
23318

Plant #	Stor.	# Seeds	Wt.	Notes	Plant #	Stor.	# Seeds	Wt.	Notes	Plant #	Stor.	# Seeds	Wt.	Notes
23318 Active					23318 Base					23318 Back up				
1		275	0.040		1		117	0.017		1				
2					2		258	0.022		2				
3					3		1600	0.232		3				
4					4		1462	0.212		4				
5					5		496	0.072		5				
6					6		420	0.061		6				
7					7		1717	0.249		7				
8					8		206	0.018		8				
9					9		2900	0.406		9				
10					10		2524	0.366		10				
11					11		289	0.042		11				
12					12		1234	0.179		12				
13					13		2544	0.369		13				
14					14		441	0.064		14				
15					15		480	0.048		15				
16					16		5100	0.741		16				
17					17		531	0.077		17				
18					18		282	0.041		18				
19					19		675	0.098		19				
20					20		4296	0.623		20				
21					21		282	0.041		21				
22					22		3641	0.528		22				
23					23					23				
24					24					24				
25					25					25				
				Total Fruits					Total Fruits					
		275	0.040	0			31495	4.506	0			0	0.000	
Parents		TSD	TWT		Parents		TSD	TWT		Parents		TSD	TWT	
				31,770	Total Seeds					TSD	TWT			
				23	Total Parents					Active	275	0.040		
				4.546	Total Seed Weight					Base	31495	4.506		
				0.014	Avg. 100 Seed Weight					Backup	0	0.000		
				#DIV/0!	Avg. viable seeds per fruit									



SEED BANK COLLECTION REPORT

Sidalcea pedata

CNDDDB EO# 5

Malvaceae

(bird-footed checkerbloom)

23319 ... SD wild collected in USA United States: California: San Bernardino: San Bernardino Mountains: South side of Big Bear Lake; Eagle Point; north of Swan Road, south of Stone Bridge Road, west of Meadow View Drive. USGS Quad: Fawnskin. Sierran; Cascade: Forest meadow. 6789 ft. 34.24899°N, 116.89524°W. CDFG funded bulk sampled conservation seed collection; very threatened species and population; federally and state listed Endangered; CNPS listing 1B.1. Semi shade Scott Eliason, CRAIG 1612. 27 Jul 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4390	23319	2010	1B.1	FE/SE	21	3

Based on the quantity of seed and the number of individuals sampled this collection **IS NOT** considered sufficient to serve its intended purpose as a conservation seed collection.



Photo of accession 18408 by John Macdonald 2009

The preceding table shows the quantity of filled sound seed that was extracted from the total number of seed received. Hollow, sterile, or parasitized seeds were removed using an air blower unit. Viability (% pure live seed) is estimated to be greater than 95% based on a dissection exam where 5 of 5 of the lightest weight seeds are filled and sound.

These seeds were dried to equilibrium at 12% - 18% relative humidity. After three weeks the seeds were placed into heavy duty foil/plastic seed pouches, heat sealed, and placed into storage at -18° C.

Germination Test Results

Due to the small quantity of seed no germination tests were conducted on this collection.

17 February, 2010

Michael Wall – Seed Conservation Program Manager



SEED BANK COLLECTION REPORT

11 March, 2011

Thelypodium stenopetalum **CNDDDB EO# new** **Brassicaceae**
 (slender-petaled thelypodium)

23322 ... SD wild collected in USA

United States: California: San Bernardino: San Bernardino Mountains: South side of Big Bear Lake; Eagle Point; north of Swan Road, south of Stone Bridge Road, west of Meadow View Drive. USGS Quad: Fawnskin. Sierran/Cascade: Yellow Pine forest. 6779 ft. 34.24899°N, 116.89524°W. CDFG funded bulk sampled conservation seed collection; population ca. 0.75 miles southwest of CNDDDB EO# 13; very threatened species and population; federally and state listed Endangered, CNPS listing 1B.1. Semi shade Scott Eliason CRAIG 1615. 27 Jul 2010.

LOT NUMBER	ACCESSION NUMBER	COLLECTION YEAR	STATUS CNPS	STATUS FED STATE	SEED QUANTITY	# PLANTS SAMPLED
4418	23322	2010	1B.1	FE/SE	283	5

Based on the quantity of seed and the number of individuals sampled this collection **IS NOT** considered sufficient to serve its intended purpose as a conservation seed collection.



BRASSICACEAE
Thelypodium stenopetalum
 (SLENDER-PETALED MUSTARD)

Photo of accession 18411 by John Macdonald 2009

The preceding table shows the quantity of filled sound seed that was extracted from the total number of seed received. Hollow, sterile, or parasitized seeds were removed using an air blower unit. Viability (% pure live seed) is estimated to be greater than 95% based on a dissection exam where 5 of 5 of the lightest weight seeds are filled and sound.

relative humidity. After three weeks the seeds were placed into heavy duty foil/plastic seed pouches, heat sealed, and placed into storage at -18° C.

These seeds were dried to equilibrium at 12% - 18%



Germination Test Results

Initial germination tests were conducted on 0.5% agar solution on clear plastic examination plates maintained at 11 hrs. light at 20° C and 13 hrs. dark at 12° C. Test results indicate that there **is** physical dormancy that inhibits germination in a percentage of fresh seed under these test conditions.

LOT_NUM	ACC #	# TESTED	SEED TYPE	START_DT	END_DT	# GERM	% GERM	PRE TREATMENT	MISC
4418*1	23322	25	Fresh seed	11-Feb-11	7-Mar-11	13	52	Cold moist stratification; up to 14 days at 5° C	seedlings etiolated but with healthy root and cotyledon development; ungerminated seeds filled and sound within

No image

11 March, 2011

Michael Wall – Curator and Seed Conservation Program Manager