64nd Annual Report
National Cooperative Dry Bean Nurseries

2013

Compiled by
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USDA-ARS

Cooperative Investigation among California, Colorado, Idaho, Maryland, Michigan, Montana, Nebraska, New York, North Dakota, Washington, and Wyoming -State Experiment Stations and Agricultural Research Centers- as part of the Regional W2150 Multi-State Project

and

University of Guelph, Canada

and

Agriculture Research Service – USDA

Call for 2014 Cooperative Dry Bean Nursery

Seed Submissions

It is time to request seed submission for 2014 Cooperative Dry Bean Nurseries. I would like to receive **the list of seed submission** no later than **April 1, 2014** and **the seed** must be here no later than **April 15, 2014**. All entries will be planted in replicated test plots across several locations in the United State and Canada. Data will be taken for seed yield, 100-seed weight and several agronomic and marketing characteristics. They will also be included in several disease nurseries including bean rust and …... Michigan will conduct canning tests.

The seed requirements for each of the three groups are as follows:

1. Small-seeded (Black, Navy, Others): **15 lbs/line**.
2. Medium-seeded (Great Northern, Pink, Pinto, Small Red, Others): **25 lbs/line**.
3. Large-seeded (Cranberry, Kidney, Others): **35 lbs/line**.

Or 20,000 seeds

As in the past, all lines must be:

X Western grown (West of the Rocky Mountain)
X Pathogen free
X If susceptible to BCMV, an ELISA test will be required.
X Acceptable commercial quality (no broken, decayed, or off color seed)
X **Seed should be untreated**

Fees: This fee structure was decided by the W-1150 members at The Annual meeting in Mayaguez, Puerto Rico in 2003

Public institutions: $150/ line submitted
Private institutions: $300/line submitted

NURSERY OPERATIONS

Public institutions that request a nursery will be charged US $150 to defray seed handling expenses including treating, bagging, boxing and shipping costs. Please let me know if your institution is going to submit the seeds and participate in the field trial for 2014 CDBN.

Should you have any questions or concerns about the submission or participant fees please contact me or if you know anyone else who might like to submit seed or plant the nursery please let me know.

Contact and Shipping Information:

Dr. Phil Miklas
USDA/ARS - IAREC
24106 North Bunn Road
Prosser, WA 99350
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Table 1. List of Contributors and Cooperators - 2013

Name	Location	Seed Submit	Planting seed	Locations no.
Shree Singh	Kimberly, ID		yes	1
Mike Moore	Powell. WY		yes	2
Paul Gepts, Antonia Palkovic	Davis, CA	yes	yes	3
Phil Miklas	Othello, WA	yes	yes	4
Mark Brick, Barry Ogg	Ft. Collins, CO		yes	5
Juan M. Osorno	Fargo, ND; Perham, MN		yes	6
Carlos Urrea, Jim Schild	Scottsbluff, NE		yes	7
Jim Kelly, Evan Wright	Frankenmuth, MI	yes	yes	8
Don Halseth Eric Sandsted	Freeville, NY		yes	9
Joyce Eckhoff	Sidney, MT		yes	10
Peter Pauls, Tom Smith Alireza Navabi	Elora R.S, Ont	yes	yes	11
Augustine Obour	Lingle, WY		yes	12
Talo Pastor- Corrales	Beltsville, MD		yes (rust test)	
Bill Dean	Kimberly, ID	yes	yes (1 rep)	

Table 2. Contact information for 2013 Cooperative Dry Bean Nursery

Loc	First	Last	Affiliation	EMAIL	Phone
CA	Paul	Gepts	University of CA – Davis	plgepts@ucdavis.edu	530-752-774
CA	Antonia	Palkovic	University of CA – Davis	antoniapalkovic@gmail.com	
CO	Mark	Brick	Colorado State University	Mark.Brick@colostate.edu	970-491-6551
	Barry	Ogg	Colorado State University	Barry.Ogg@Colostate.edu	
ID	Shree	Singh	University of Idaho	singh@kimberly.uidaho.edu	208-423-6559
MD	Marcial	Pastor-Corrales	USDA/ARS	pastorm@ba.ars.usda.gov	301-504-6600
MI	Jim	Kelly	Michigan State University	kellyj@msu.edu	517-355-0271 ext. 1181
MT	Joyce	Eckhoff	MSU Eastern Ag Research Center	joyce.eckhoff@montana.edu	406-433-2208
ND	Juan	Osorno	North Dakota State University	juan.osorno@ndsu.edu	701-231-8145
NE	Jim	Schild	University of Nebraska	jschild@unl.edu	308-632-1480
NY	Donald	Halseth	Cornell University	deh3@cornell.edu	607-255-5460
	Eric	Sandsted	Cornell University	ers23@cornell.edu	
ON	Peter	Pauls	University of Guelph	ppauls@uoguelph.ca	519-824-4120 ext 52460
	Tom	Smith	University of Guelph	thsmith@uoguelph.ca	519-824-4120 ext 8339
	Ali	Navabi	AAFC	alireza.navabi@agr.gc.ca	519-824-4120 ext. 56829
PR	James	Beaver	University of Puerto Rico	j_beaver@hotmail.com	787-832-4040 ext. 2566
WA	Phil	Miklas	USDA-ARS	phil.miklas@ars.usda.gov	509-786-9258
WY	Mike	Moore	University of Wyoming	mdmoore@uwyo.edu	307-754-9815
WY	Augustine	Obour	University of Wyoming	aobour@uwyo.edu	307 837 2000

Table 3. List of 2013 Cooperative Dry Bean Nursery Entries

	Line	Previous no.	Source	Type
1	Othello		check	pinto
2	PT9-6		ARS-Miklas	pinto
3	PT11-9		ARS-Miklas	pinto
4	ISB-18		ISB-Dean	pinto
5	ISB-19		ISB-Dean	pinto
6	ISB-20		ISB-Dean	pinto
7	ISB-21		ISB-Dean	pinto
8	Rosetta	S08418	Kelly-MSU	pink
9	UCD 9634		Gepts-UCD	pink
10	GN9-4		ARS-Miklas	GN
11	T-39		check	black
12	Rexeter		Smith - Guelph	Navy
13	OAC Inferno		Smith - Guelph	LRK
14	CELRK		check	LRK
15	Majesty		Rupert AAFC	DRK
16	Canario 707		Gepts-UCD	Yellow

The 2013 CDBN

The 2013 CDBN comprised 13 test entries and three checks.

Agronomic nurseries
There were approximately 1600 seeds supplied to each location sufficient to plant four 4-row replications, 20 to 25 feet long, for each entry. Seed treatment was provided by Syngenta (Sam Thornton & Doug Deschamp) and consisted of Cruiser, Maxim XL + Apron XL (MSDS are included with bean shipment unless nursery operator requested otherwise). Note Idaho Seed Bean received 100 seeds of each entry for observation.

Disease Nurseries
There were 400 seeds (untreated) supplied to Beltsville, MD, for rust screening.

DATA RECORDING AND SCALES

The following were commonly recorded data by the CDBN collaborators. For ease and uniformity of reporting we shall describe and abbreviate each trait:
1. **Early Vigor (EV)**: Scored on a 1 to 9 scale, where 1= excellent and 9= very poor, within the first 3 weeks after emergence.
2. **Days to Flower (DF)**: Actual number of days from planting to when approximately 50% plants in a plot have at least one opened flower.
3. **Days to Maturity (DM)**: Actual number of days from planting to when approximately 50% of plants in a plot have at least one dry pod.
4. **Plant Height (PH)**: Record in cm from the base of the plant (soil surface) to the top node bearing at least one dry pod with seed.
5. **Growth Habit (GH)**: Record during flowering and verified when crop is senescent as type I=determinate erect or upright, II= indeterminate erect, and III= indeterminate prostrate.
6. **Lodging (LG)**: Scored at harvest on a 1 to 9 scale, where 1= 100% plants standing erect, and 9= 100% plants lay flat on the ground.
7. **Pod Clearance (PC)**: Recorded at harvest as percent of pods on plants not touching the ground or in contact with the soil surface.
8. **Biomass Yield (BY)**: Total plant dry weight recorded at 12% moisture and rounded up to the nearest whole number (lb/a).
9. **Seed Yield (SY)**: Recorded in lb/a at 12 % moisture and rounded up to the nearest whole number.
10. **Harvest Index (HI)**: The ratio of SY/BY expressed in % BY at 12% moisture.
11. **Weight of 100 seeds (SW)**: Weight of 100 randomly taken undamaged seed in grams at 12 % moisture.
12. **Appearance Desirability (SD)**: An aggregate value for seed size, shape, color and brilliance for the respective market class recorded by various scales (see footnotes).

For other traits and scoring methods, a footnote is provided with associated details.

Table 4. Summary agronomic and rust reaction data for the 2013 CDBN.

Line	Market Class†	Seed yield	Seed wt.	Flowering	Harvest maturity	CO Rust	MD Rust
		lbs/A	g 100 sd^{-1}	days	days	1 to 6	1 to 9
T-39	black	2703	19.7	51	100	2	1
Rexeter	navy	3025	19.5	47	101	Seg	4
Rosetta	pink	3080	32.5	47	97	5,6	5.5
UCD-9634	pink	2842	32.9	43	93	5,6	7
ISB-18	pinto	2533	36.9	44	93	6	8
ISB-19	pinto	3105	38.0	44	95	2	4
ISB-20	pinto	2642	39.0	42	91	2	2
ISB-21	pinto	2839	38.7	43	93	5,6	7.5
Othello	pinto	2564	36.6	42	87	6	8
PT11-9	pinto	3287	36.6	46	95	2	2
PT9-6	pinto	3130	35.5	47	97	2	2
GN9-4	GN	3116	35.4	46	97	2,3	4
Majesty	DRK	2402	49.6	41	91	4	5
CELRK	LRK	2419	68.6	44	104	4	5
OAC-Inferno	LRK	2736	61.8	46	98	4	3
Canario707	Yellow	2774	58.0	46	104	3	2.5

†Across locations not all market classes are tested in the exact same trial. At certain locations large, medium and small seeded market classes are tested in different trials within the same field or in completely different locations.

Table 5. 2013 Summary for seed yield (lbs/A) for individual locations and averaged across locations.

		14-June	10-June	23-May	7-June	12-June	4-June	17-June	6-June	3-June	27-May	
Line	**Class**	**CA**	**CO**	**ID**	**MI**	**ND**	**NE**	**NY**	**ON**	**WA**	**WY**	**Mean**
T-39	black	2632	2995	1475	2232	2230	2578	2773	2990	4008	3115	2703
Rexeter	navy	2769	3287	1850	2249	2610	3335	2645	3842	4140	3521	3025
Rosetta	pink	2440	2781	1850	2250	3390	3239	3006	3985	4694	3161	3080
UCD-9634	pink	3613	1223	2131	2289	3090	3251	2234	3576	3858	3150	2842
ISB-18	pinto	2397	*	1756	2158	2860	2963	1207	2993	3244	3215	2533
ISB-19	pinto	3041	3389	1920	2434	2870	3024	2254	3947	4159	4015	3105
ISB-20	pinto	2904	2588	1815	1644	2540	3540	1720	3212	2937	3518	2642
ISB-21	pinto	2997	*	2026	2119	2590	3500	1886	3260	3573	3603	2839
Othello	pinto	2895	*	1686	1677	2650	3277	2051	2708	2894	3239	2564
PT11-9	pinto	3287	3436	2283	2122	3050	3657	2367	3827	4515	4327	3287
PT9-6	pinto	3217	3434	2564	1980	3460	3460	2670	2691	4405	3423	3130
GN9-4	GN	3374	3186	1920	2188	3580	3453	2279	3466	4415	3299	3116
Majesty	DRK	2040	1008	1593	3250	2110 ł	2688	1057	3413	3647	3219	2402
CELRK	LRK	2253	1943	1136	3510	1740	2487	2019	3748	2891	2460	2419
OAC-Inferno	LRK	2597	2476	1862	1740	2700	2570	3019	3211	3833	3352	2736
Canario707	Yellow	2669	3114	1534	1870	2720	2541	2546	3551	3886	3314	2774
Mean		2815	2219	1838	2232	2762	3098	2233	3401	3819	3370	2779
CV %		11	12	19.4	9.4	12.2	16.1	11	10.5	9.5	14	
LSD 0.05		829	376	596	252	490	713	372	426	575	673	

* Yield not reported due to severe rust infection

ł Planting date for large-seeded types in ND/MN was May 26th.

Table 6. 2013 Summary for seed weight (g 100 seeds^{-1}) for individual locations and averaged across locations.

Line	Class	CA	CO	ID	MI	ND	NE	NY	ON	WA	WY	Mean
T-39	black	19.3	18.0	22.3	19.5	17.6	18.1	19.8	20.1	21.9	20.0	19.7
Rexeter	navy	18.5	16.9	20.3	20.5	18.1	17.8	19.9	21.0	21.6	20.0	19.5
Rosetta	pink	32.9	29.4	35.2	32.8	28.3	31.4	32.5	32.1	38.2	32.0	32.5
UCD-9634	pink	35.2	27.8	34.9	31.4	30.7	30.3	30.0	35.7	37.6	35.0	32.9
ISB-18	pinto	37.4	29.1	40	35.4	35.6	36.0	33.3	38.5	43.9	40.0	36.9
ISB-19	pinto	37.8	38.0	39.2	36.6	35.5	34.7	35.4	39.6	44.0	39.0	38.0
ISB-20	pinto	40.1	38.4	38.9	38.2	37.2	38.9	36.1	37.7	44.0	41.0	39.0
ISB-21	pinto	39.3	29.7	41.0	35.8	36.9	38.3	37.9	41.3	45.7	41.0	38.7
Othello	pinto	38.4	28.7	35.9	34.4	33.6	38.5	34.6	40.0	44.0	38.0	36.6
PT11-9	pinto	34.9	34.2	45.0	37.1	33.2	35.9	35.6	30.0	45.0	35.0	36.6
PT9-6	pinto	34.7	32.8	36.7	39.4	33.6	33.6	35.4	31.2	41.6	36.0	35.5
GN9-4	GN	34.8	32.4	39.4	37.1	32.1	34.9	34.1	34.3	38.9	36.0	35.4
Canario707	Yellow	46.4	42.2	50.1	53.0	46.1	46.3	50.0	56.7	53.9	51.0	49.6
Majesty	DRK	55.8	58.7	58.9	79.1	75.4	64.9	65.2	82.7	73.3	72.0	68.6
CELRK	LRK	52.6	60.7	51.5	79.5	59.0	54.1	66.9	70.3	62.4	61.0	61.8
OAC-Inferno	LRK	51.9	50.3	49.2	60.8	63.7	49.0	62.4	69.8	61.7	61.0	58.0
Mean		42.0	35.4	39.9	41.9	30.9	37.7	39.3	42.6	38.9	41.0	39.0
CV %		2.8	4.8	24.8	4.4	6.7	4.8	4		4	4	
LSD 0.05		2.8	2.4	17.2	2.1	4.0	2.6	3		3.0	2	

Table 7. 2013 Summary for number of days to flower across locations and harvest maturity (days) for individual locations and average across locations.

		Days to flower							Days to harvest maturity								
Line	**Class**	**CA**	**MI**	**ON**	**NE**	**WY**	**Mean**		**CO**	**MI**	**ND**	**NE**	**NY**	**ON**	**WA**	**WY**	**Mean**
T-39	black	53	48	52	44	60	51		92	104	96	92	89	120	104	101	100
Rexeter	navy	53	42	43	43	56	47		93	106	95	98	92	119	107	102	101
Rosetta	pink	52	40	46	41	57	47		89	101	100	91	87	112	106	95	97
UCD-9634	pink	41	39	41	41	55	43		81	101	91	91	85	116	91	92	93
ISB-18	pinto	43	40	43	40	56	44		81	102	95	92	76	111	92	92	93
ISB-19	pinto	42	39	43	40	56	44		84	100	95	91	79	119	97	96	95
ISB-20	pinto	40	38	42	39	53	42		84	97	89	89	78	104	95	91	91
ISB-21	pinto	41	40	42	39	54	43		85	100	96	90	76	108	94	92	93
Othello	pinto	39	38	40	39	53	42		75	95	90	86	74	102	89	86	87
PT11-9	pinto	48	40	45	40	55	46		89	100	91	88	82	109	101	97	95
PT9-6	pinto	50	42	47	41	57	47		91	98	94	90	85	114	107	97	97
GN9-4	GN	45	42	45	41	56	46		90	102	94	90	86	117	103	96	97
CELRK	LRK	40	34	36	39	54	41		79	98	100	86	76	108	91	89	91
OAC-Inferno	LRK	42	43	38	40	55	44		89	105	114	101	102	119	107	94	104
Majesty	DRK	46	42	43	42	56	46		85	102	109	92	88	115	98	97	98
Canario707	Yellow	46	46	42	40	56	46		89	106	107	101	102	120	112	97	104
Mean		45.0	41	43	41	55	45		86	101	98	92	85	113	99	95	96
CV %		3.3	2.6	2.1	2.2	4			3	1.4	4	2.4	2	2.3	2.6	4	
LSD 0.05		3.9	1.8	1.1	1.3	3			3	2.3	5	3.2	3	3.1	4.2	6	

Table 8. Rust reaction data for 2013

Line	Class	Reaction	MD[1]	CO[2]
T-39	black	Resistant[3]	1	2
Rexeter	navy	Intermediate	4	Seg
Rosetta	pink	Intermediate	5.5	5,6
UCD 9634	pink	Susceptible	7	5,6
ISB 18	pinto	Susceptible	8	6
ISB 19	pinto	Intermediate	4	2
ISB 20	pinto	Resistant	2	2
ISB 21	pinto	Susceptible	7.5	5,6
Othello	pinto	Susceptible	8	6
PT11-9	pinto	Resistant	2	2
PT9-6	pinto	Resistant	2	2
GN9-4	GN	Intermediate	4	2,3
Majesty	DRK	Intermediate	5	4
CELRK	LRK	Intermediate	5	4
OAC Inferno	LRK	Resistant	3	4
Canario 707	Yellow	Resistant	2.5	3

For MD rust, scale is based on disease severity and incidence with 1 = best and 9 = worst. Rust checks (MD) UI-114 = 8, Aurora = 5, and Buster = 2.

Rust for CO is based on 1 = no symptom, 2 – necrotic fleck, 3 is small pustule and 4, 5, 6, are larger pustules.

Table 9. Miscellaneous trait data for 2013 CDBN.

		WA	MI	ND	ON	CO	ID	MI	WA	MI	ON	NY	NY	WA
		Emerg-ence	Height	Height	Height	Plant habit	Plant habit	Lod-ging	Lod-ging	Desira-bility	Harvest-ability	Bio-mass	Harvest index	Seed appear
Line		**1 to 9**	**(cm)**	**(cm)**	**(cm)**			**1 to 5**	**1 to 9**	**1 to 7**	**1 to 5**	**lbs/A**	**index**	**1 to 5**
T-39	black	2.3	44.0	55	40.8	2	III	3.5	8.7	3.0	5.0	5049	55	2.3
Rexeter	navy	2.0	50.5	59	47.5	2	III	2.0	7.0	3.5	3.4	5035	53	2.5
Rosetta	pink	2.0	56.0	63	51.0	2	II	1.0	6.0	5.3	2.3	5433	55	3.5
UCD-9634	pink	1.3	53.0	60	41.3	2	III	2.5	7.0	4.0	4.1	4524	49	3.0
ISB-18	pinto	2.0	56.5	60	40.8	2	II b	2.0	6.7	4.0	4.4	2830	43	3.5
ISB-19	pinto	2.3	48.5	52	35.3	3	III	3.0	7.7	4.0	5.0	4349	52	4.0
ISB-20	pinto	2.3	48.0	47	30.3	3	III	3.0	8.2	3.0	5.0	3526	49	2.0
ISB-21	pinto	2.0	52.5	52	35.0		III	3.1	8.0	3.7	5.0	3924	48	4.5
Othello	pinto	2.3	34.9	41	34.5	2b	III	3.5	8.7	3.0	4.9	3759	55	3.0
PT11-9	pinto	3.0	56.6	60	45.5	2	II	2.1	6.7	5.0	3.8	4636	51	3.5
PT9-6	pinto	2.7	51.0	60	42.3	2	III	2.5	7.5	4.0	5.0	4884	55	2.5
GN9-4	GN	3.0	54.9	64	45.0	2b	II	2.0	5.3	5.0	2.9	4625	49	2.5
Majesty	DRK	2.3	48.5	44	47.0	1	II b	2.0	3.3	4.0	3.1	2620	40	3.5
CELRK	LRK	3.3	48.5	44	50.3	1	I	2.0	3.5	4.3	2.8	3880	52	2.0
OAC-Inferno	LRK	2.0	48.5	51	49.0	1	I	3.0	7.3	3.0	4.3	6000	50	2.5
Canario707	Yellow	1.7	49.0	53	44.5	1	I	3.0	7.8	3.0	3.9	5443	47	2.5
Mean		2.5	50.1	52.3	42.5			2.5	6.6	3.9	4.0	4407	50	3.0
CV %		25	2.8	9	8.1			16.3	11	6.0	11.2	8	5	
LSD 0.05		1.1	2.5	7	4.1			0.6	1.2	0.3	0.5	516	4	

Emergence whereby 1 = best and 9 = worst; lodging 1 = best and 5 or 9 = worst. Desirability where 7 is best and 1 is worst. Harvest-ability where 1 is best and 5 is worst. Seed appearance where 1 is best and 5 is worst.