UNIVERSITY OF CALIFORNIA Agriculture and Natural Resources | Cooperative Extension

UC DAVIS UNIVERSITY OF CALIFORNIA

UC Dry Bean Field Day

Thursday, August 14, 2025
9:45am – 12:00pm
UC Davis, Bee Biology Road (38.537080, -121.787661), Davis, CA

Agenda

9:30am Arrival and sign-in

9:45am Welcome and introductions
Christine Diepenbrock, Antonia Palkovic, UC Davis; Michelle Leinfelder-Miles, UCCE

9:50am Walk to field plots

10:00am Developing breeding resources to improve lima and garbanzo adaptation and quality
Christine Diepenbrock and Antonia Palkovic; UC Davis

10:20am Sensory evaluation work in lima beans
Jaclyn Adaskaveg; UC Davis

10:25am Genetic basis of lima bean adaptation traits
Travis Parker and Varma Penmetsa; UC Davis

10:30am Travel to Agronomy Field Headquarters, follow the signs to the field location.

10:45am Choosing varieties for pest resistance, high yields, and high quality – regional trial results
Michelle Leinfelder-Miles; UC Cooperative Extension

11:00am Weed identification and weed management in dry beans
Giuliano Galdi; UC Cooperative Extension

11:15am Cowpea breeding for California – biotic and abiotic stress resistance
Bao-Lam Huynh; UC Riverside

11:30am Station rotation – Visit researchers at different stations in the field.

- Seed station:
  - Cowpea seed size: Sassoum Lo, Jonny Berlingeri, Maggie Riggs; UC Davis
  - Common bean seed diversity: Tayah Bolt; UC Davis
  - Garbanzo seed diversity: Varma Penmetsa; UC Davis
  - Lima and garbanzo breeding lines: Christine Diepenbrock, Antonia Palkovic; UC Davis
- Sensing station:
  - Drone data extraction: Travis Parker; UC Davis
  - Mobile phone/drone/ground-based rover: Earl Ranario, Heesup Yun; UC Davis
- Plot walk-through (cowpea, common bean, common bean/tepary bean interspecific lines)
  - Michelle Leinfelder-Miles, Giuliano Galdi, UCCE; Bao-Lam Huynh, UC Riverside

12:00pm Burrito lunch at Agronomy Field Headquarters

Applied for DPR (1.0 of Other) and CCA (1.0 of PM; 1.0 of CM) credits.
We thank the CA Crop Improvement Association for financially supporting this meeting!

UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources

Coming Soon!

FALL 2025

BLACKEYE BEAN
Production in California

Second Edition

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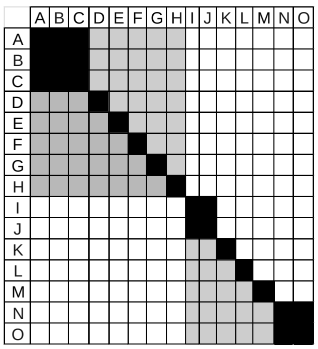
Overview of the garbanzo breeding program

Antonia Palkovic, Jesse North, Solar Parry, Jonathan Berlingeri, Sarah Light, Nicholas Clark, Michelle Leinfelder-Miles, Varma Penmetsa, and Christine Diepenbrock

Overview: Our breeding program is focused on improving garbanzos for yield, seed size, and other aspects of regional adaptation and seed quality.

Breeding strategy: We have been generating a **'half-diallel'** (crossing each parent with each other parent, but avoiding crosses between related/similar individuals and not making reciprocal crosses), followed by **recurrent selection** (intermating the best individuals in each round).



Parents in half-diallel (F_2, F_5, and F_7's from certain crosses were in the 2025 field):

- Entries with high yield and [extra-]large seed size. This set includes varieties and advanced breeding lines, and USDA materials identified in past field trials and/or that are newly ordered (from which 80+ entries are also currently under evaluation).
- Entries that are 'donors' for other traits such as drought tolerance, including recombinant inbred lines identified in past field trials; disease resistance, emergence/vigor, etc. Also being incorporated via backcross breeding.

Summary of results:

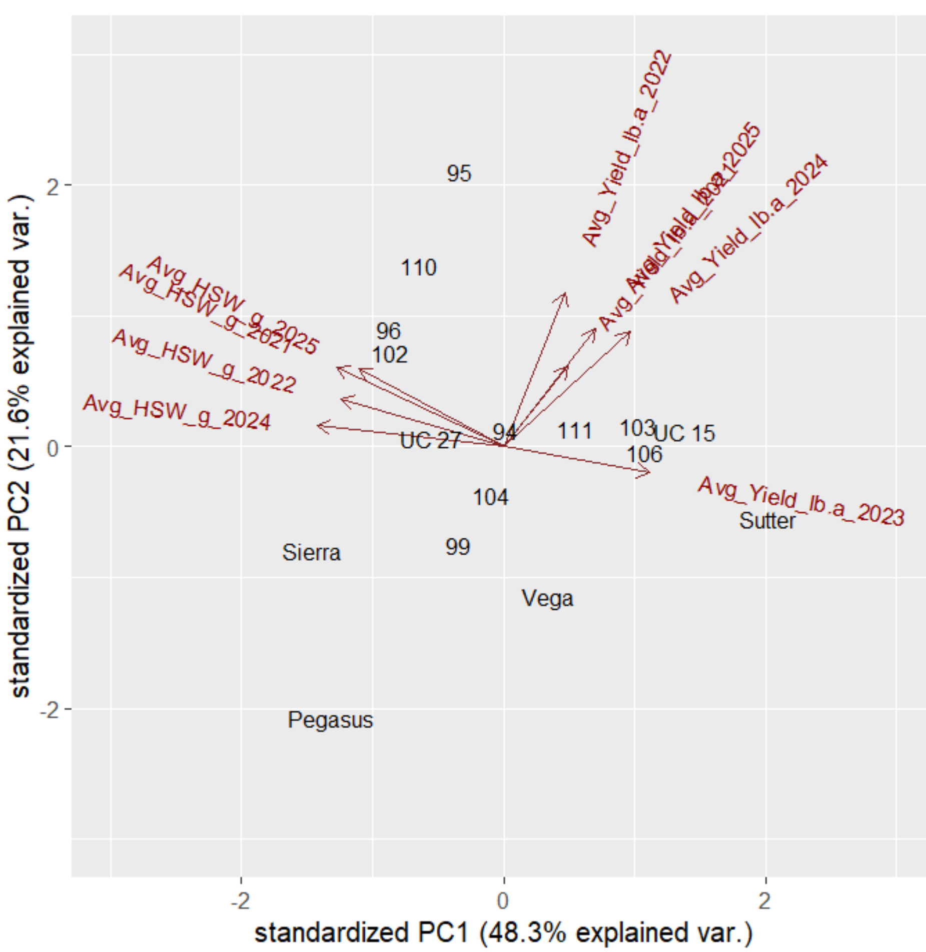
Yield and hundred-seed weight (HSW) in 2025 and across years

In the 2025 Davis trial:
Four replicates, 50' plots

Entry	Avg. Yield (lb/a)	Avg. HSW (g)
95	3140.5	55.9
103	3029.7	55.0
110	2910.2	58.6
Sutter	2867.6	47.8
106	2814.7	51.7
111	2709.4	55.3
UC15	2544.9	51.9
102	2527.5	59.0
104	2512.5	56.6
99	2473.5	55.9
UC27	2473.5	55.7
Sierra	2363.0	59.2
ICC4958	2330.6	41.6
Vega	2327.1	53.1
96	2276.3	56.8
94	2195.4	54.2
PI339221	3140.5	51.9
Pegasus	3029.7	52.2

Note: Average seed moisture at harvest was 13.1% (range of 11.7-14.6%) in 2025, vs. 5.0% and 6.5% in the previous two years. HSW was relatedly somewhat higher in 2025.

Summary of across-year performance:
Five years of replicated field trials



Performance in 2024 regional trials by Nick Clark, Sarah Light, Michelle Leinfelder-Miles, and teams at UC ANR:

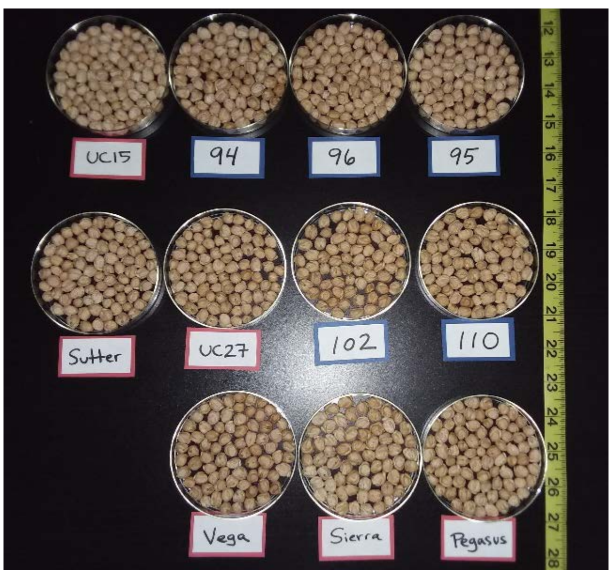
West Side - Nick Clark and team			
Entry	Yield (lb/a)		HSW (g)
	Avg.	SD	Avg.
96	1176.4	187.1	35.3
111	1138.0	280.3	35.0
106	1075.6	113.1	34.0
99	1027.6	50.8	**38.1**
UC27	1013.2	390.9	36.5
AWF-1	989.1	179.2	37.1
95	989.1	329.1	35.8
110	960.3	120.5	**40.4**
104	902.7	378.3	33.1
103	873.9	284.2	33.0
94	840.3	124.8	35.6
102	701.0	55.4	**39.3**

Colusa - Sarah Light and team			
Entry	Yield (lb/a)		HSW (g)
	Avg.	SD	Avg.
104	4003.2	436.2	43.1
Sutter	3388.5	247.9	34.2
102	3259.0	590.1	42.6
94	3236.9	1137.1	44.9
110	3100.3	588.9	39.9
UC27	3032.9	453.9	**47.6**
96	3019.7	449.1	**49.2**
95	3013.2	618.3	45.9

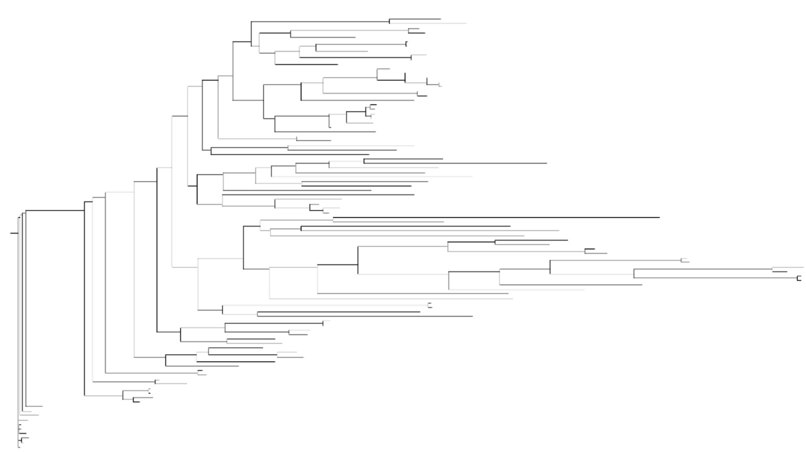
Blue shading is used to mark entries that were not tested in Colusa or SJC in 2024.

SJC - Michelle Leinfelder-Miles and team		
Entry	Yield (lb/a)	HSW (g)
Field UC27	1705	**42.3**
104	1611	37.0
102	1540	38.3
110	1513	**41.8**
95	1490	39.7
96	1476	**40.5**
94	1417	36.4
Sutter	1281	33.1
UC27	1179	34.1

Seed of advanced breeding lines alongside commercial checks:



Using DNA information to be more efficient in breeding and verify hybridity when making crosses and line purity:



Next steps:

- Pursuing varietal releases in garbanzos. If you are interested in on-farm trialing recent garbanzo materials, please feel free to reach out to us and your local UC Cooperative Extension team.
- Continued crossing and generation advance ⟶ more early- and mid-generation materials for evaluation.
- Continuing to evaluate entries, increase seed, and test GxE with other parts of California, and testing for mechanisms underlying differential performance for yield and quality.

Contact information: Antonia and Christine at alpalkovic@ucdavis.edu and chdiepenbrock@ucdavis.edu.

Funding from the California Dry Bean Advisory Board. ***Thank you!***

Overview of the lima bean breeding program

Antonia Palkovic, Ivan Garcia-Lopez, Varma Penmetsa, Jaclyn Adaskaveg, Christine Diepenbrock

Overview: Our breeding program is focused on improving large- and baby-seeded limas with bush and vine growth habits for yield, seed quality, and other aspects of regional adaptation.

Goals/questions: Generation of breeding materials, field evaluation alongside commercial checks for agronomic and quality traits, and seed increase for regional trials in coordination with UC Cooperative Extension. Advanced breeding lines are also planted in Parlier, CA, this year as demonstration plots.

Summary of results:

Bush large lima (BLL) advanced breeding lines

Trait	Average yield (lb/a)					Hundred-seed weight (g)		
Entry/Year	Across years	2020	2021	2023	2024	Across years	2023	2024
E43	2198	2720	3082	1897	1095	114.6	110.0	119.1
UC92	2123	2685	2522	1941	1344	115.9	123.7	108.1
E41	2109	2775	2290	2255	1117	109.0	109.7	108.3
E42	2096	2975	2604	1717	1086	111.5	112.3	110.7
E40	2075	2573	2550	2010	1168	114.0	115.3	112.6
E39	2030	2882	2080	2327	831	119.6	122.3	116.8
E38	2029	2689	2554	1541	1330	114.5	116.7	112.2
Dompe95	1924	2536	2129	2043	987	117.9	118.3	117.4
Overall average	2073	2729	2476	1967	1120	114.6	116.0	113.1

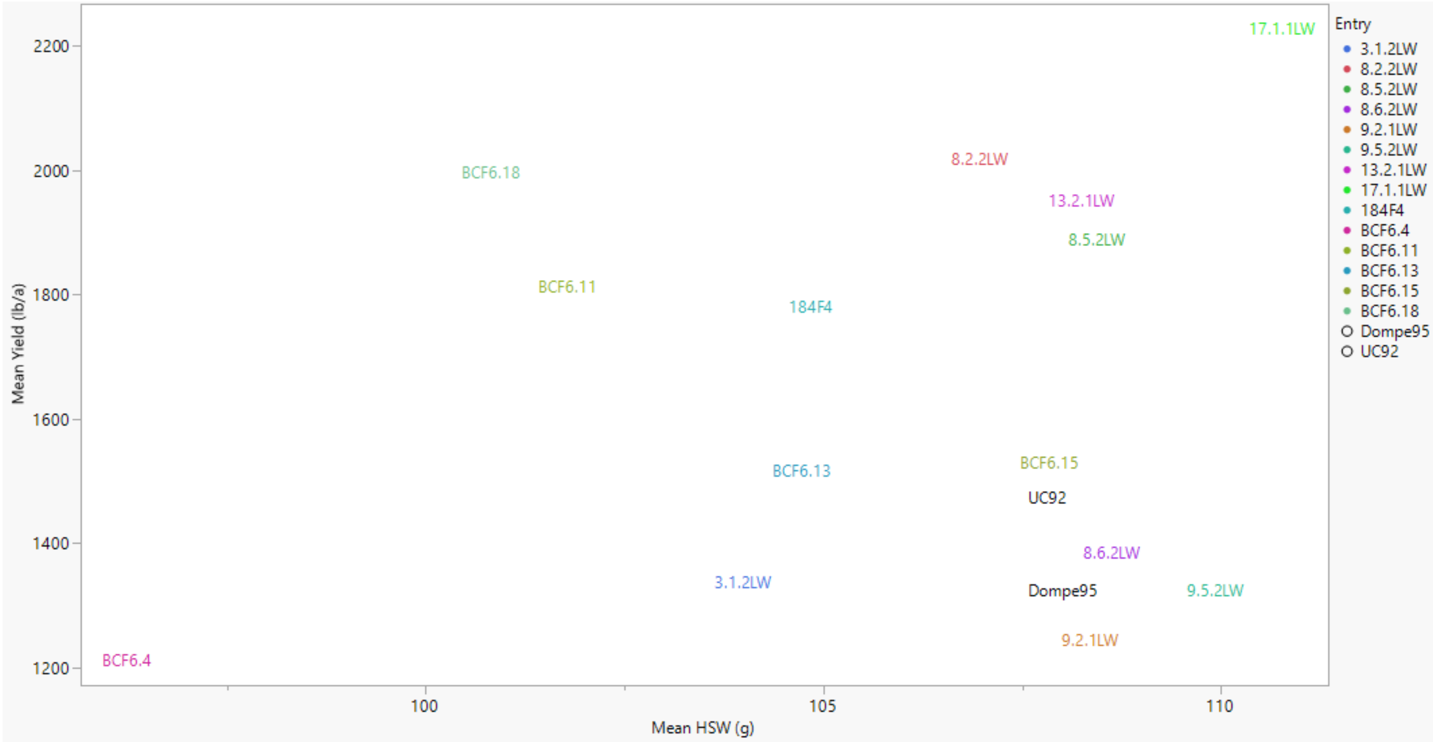
Within each column: The two highest values are in yellow, and the two lowest values are in red.
Lower yields in 2024 were thought to be due to heat waves, though harvest equipment also changed—and some breakage occurred, especially in large limas.

Bush baby lima (BBL) advanced breeding lines

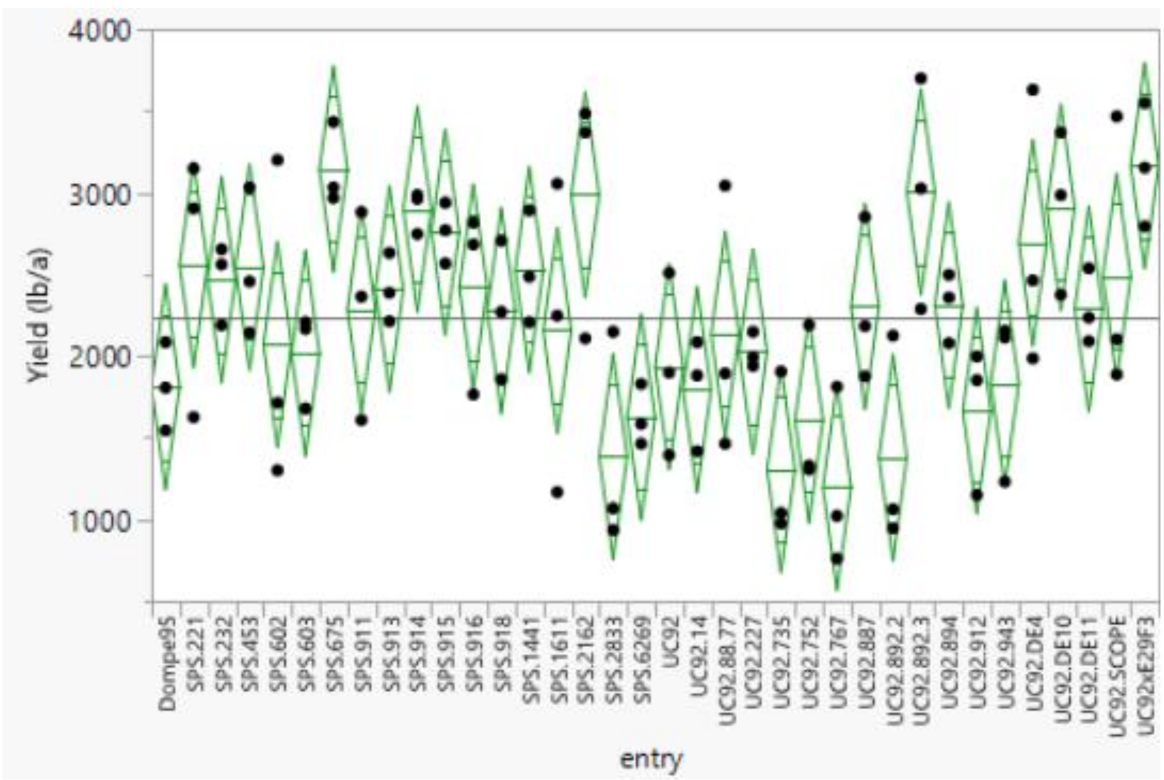
Entry	Average yield (lb/a)		
	Across years	2023	2024
Jackson Wonder	3899	4013	3785
E27	3464	2753	4176
10.5.2BWF6	3420	3275	3565
E28p	3358	3210	3505
26.1.1BWF6	3338	3133	3543
26.1.2BWF6	3328	3090	3565
Beija Flor	3276	3075	3478
10.5.1BWF6	3238	3378	3099
10.6.1LPF6	3224	3153	3295
13.3.2BWF6	3053	2620	3486
Beija Flor x UFPI628 F4?	2897	2727	3067
(G25236xG26200)F5	2786	2474	3097
E32	2557	2781	2333
E28	2534	2630	2438
Overall average	**3169**	**3022**	**3316**

Within each column: The three highest values are in yellow, and the three lowest values are in red.
Example of other materials being evaluated: entries from Univ. Delaware, including F_6's.

14 F$_5$ bush large limas: hundred-seed weight (HSW; g) vs. mean yield (lb/a) in 2024



34 F$_3$ bush large limas: yield (lb/a) in 2024



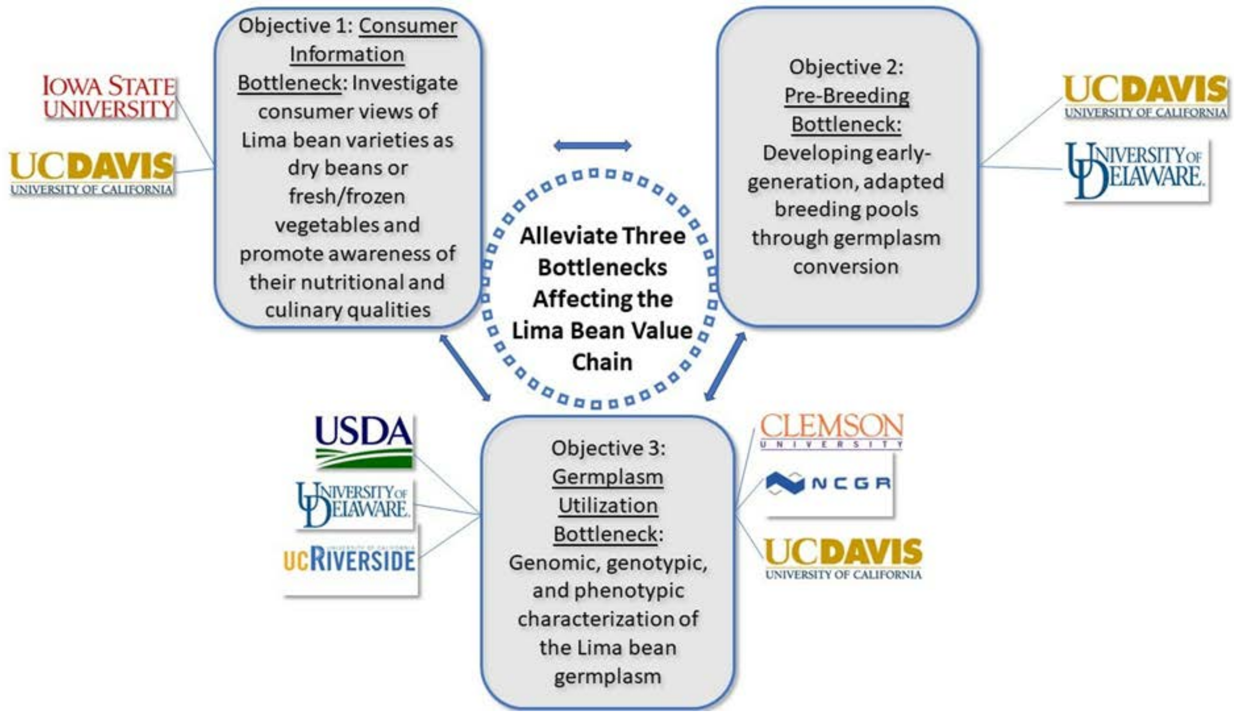
Next steps: Regional trials and varietal releases; if you would be interested in on-farm trialing, please reach out to us and your local UCCE team. Continued generation and screening of materials through use of various tools and information/work streams, within and across agronomic and consumer traits.

Contact information: Antonia, alpalkovic@ucdavis.edu; and Christine, chdiepenbrock@ucdavis.edu.

Funding from the California Dry Bean Advisory Board. ***Thank you!***

Development of Genomic Resources to Improve Lima Bean Breeding for Consumer Quality and Agronomic Traits

A collaborative project funded by the USDA National Institute of Food and Agriculture (NIFA) Specialty Crop Research Initiative (SCRI)



Eleven Project Highlights in Year 3

Within Objective 1: Information Bottleneck

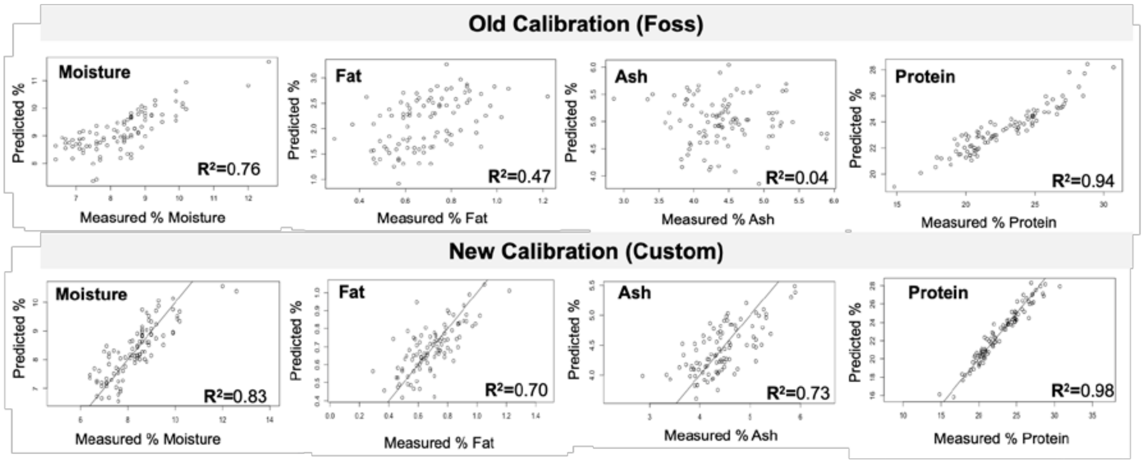
1. **Grower and consumer surveys.**
2. **Educational materials**, e.g. relating to use of drones (11:30am station) and near-infrared spectroscopy.
3. **Organization and participation in on-station/on-farm events**, graduate and undergraduate (and high school) education, and scientific meetings.

Within Objective 2: Pre-breeding Bottleneck

4. **Development and deployment of adaptation markers** to accelerate the introduction of genetic diversity from gene banks. (10:25am talk by Varma and Travis: ‘Genetic basis of lima bean adaptation traits’.)
5. **Development of additional unadapted x adapted populations**, e.g. for nematode resistance.

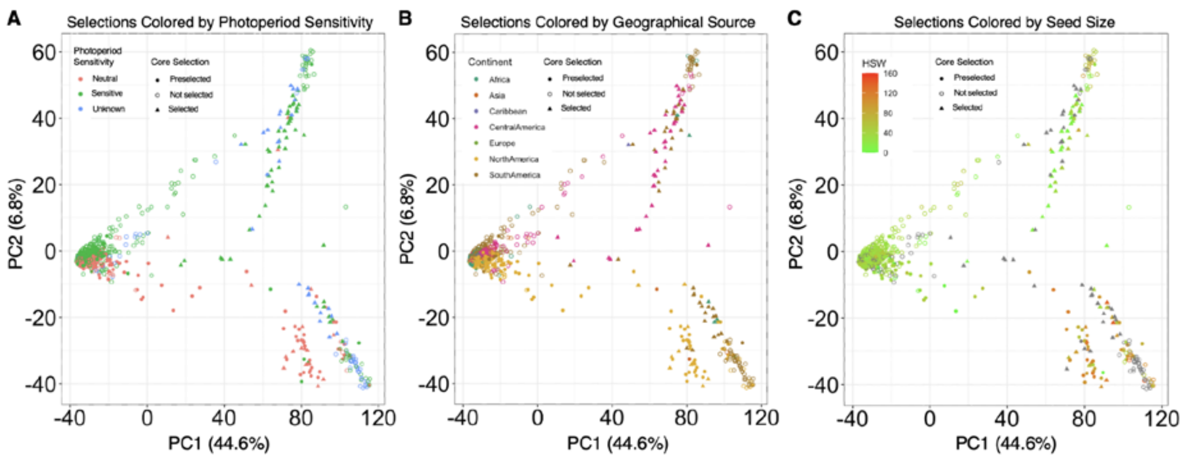
Within Objective 3: Germplasm Characterization Bottleneck

6. **Active maintenance and curation of the USDA Lima bean gene bank**, e.g. regenerations.
7. **DNA genotyping of Lima bean germplasm**, to (along with phenotypic data) characterize the germplasm and discover associations with grower, processor, and consumer traits.
8. **Seed nutritional composition analyses** and field-related variation in composition.



9. **Extensive sensory analyses of lima beans** have been conducted for the first time. (10:20am talk by Jaclyn, ‘Sensory evaluation work in lima beans’.)
10. **Multi-location field evaluations** for agronomic, phenological, and seed nutritional traits, including both northern and southern CA. (11:30am station by Jaclyn and team: lima plots to view in the field.)

USDA gene bank materials (381 field-evaluated, 316 of ~700 selected for core collection)



Recombinant inbred populations developed at Univ. Delaware; in California,
all four populations were evaluated in 2024, and all but DE17221 are being evaluated in 2025.

Name	n	Traits
DE17221	~200	Growth habit, photoperiod response, disease resistance, seed color/pattern
DE21101	~200	Heat tolerance, seed color, phenology
DE21102	~100	Plant architecture traits, phenology, seed color/pattern
DE20201	~150	Root-knot nematode resistance, seed color/pattern, heat tolerance, phenology

11. **Phenotypic evaluation of nematode resistance** in lima bean. Field and greenhouse trials were conducted to test for root-galling resistance to root-knot nematode species (*Meloidogyne incognita* and *M. javanica*), identifying five accessions with resistance to both species. A subset of accessions is being screened for root-galling resistance (*M. javanica*) and is being genotyped, as are three biparental recombinant inbred populations. In the UC92-UC Haskell population a significant gene was identified, with the favorable allele contributed by parent UC92.

This project is funded by USDA-NIFA-SCRI Grant no. 2022-51181-38323. We welcome further interactions on this project; please feel free to reach out to Distinguished Prof. Emeritus Paul Gepts at plgepts@ucdavis.edu.

Sensory Analysis of Dry Lima Beans

Yukina Murata, Jaclyn A. Adaskaveg, Antonia Palkovic, Christine Diepenbrock, Jean-Xavier Guinard

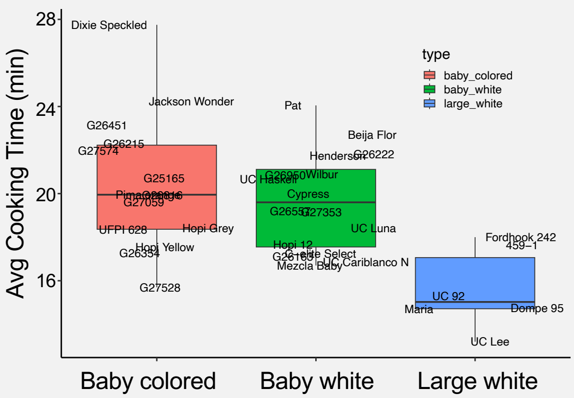
Evaluated 43 Dry Lima Lines

Large white (7)	UC 92 UC Lee Dompe 95 Maria	Fordhook 242 459-1 Ventura (WVN)
Baby white (16)	C-elite Select Cypress Henderson Hopi 12 Mezcla Baby	Pat UC Haskell UC Cariblanco N UC Luna Wilbur +5 'G codes'
Baby colored (15)	Dixie Speckled Pima Orange Hopi Grey Hopi Yellow	UFPI 628 Jackson Wonder +9 'G codes'
Large colored (1)	Winfield Pole	

UC Lee | UC Haskell | Jackson Wonder | Winfield Pole

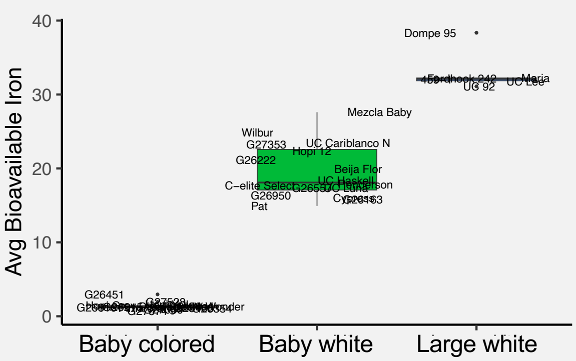
Cooking Time

Larger seeds on average cook faster than baby-seeded types.



Iron (Fe) Bioavailability

White seed types have more absorbable Fe during digestion compared to colored.



Descriptive Analysis — Jan - May 2025 — *Characterization*

Consumer Test — Oct - Nov 2025 — *Preference*

Focus Group — Jan – Mar 2026 — *Benefits/ barriers/ applications*

Significant Attributes For Cooked Dry Limas

FLAVOR

- Sweet green
- Bitter green
- Kidney bean
- Chickpea
- Potato starch
- Buttery
- Corn
- Earthy

TEXTURE

- Wrinkle
- Firmness
- Moistness
- Initial flow
- Seed coat thickness
- Texture variation
- Graininess
- Chewiness
- Difficulty swallowing

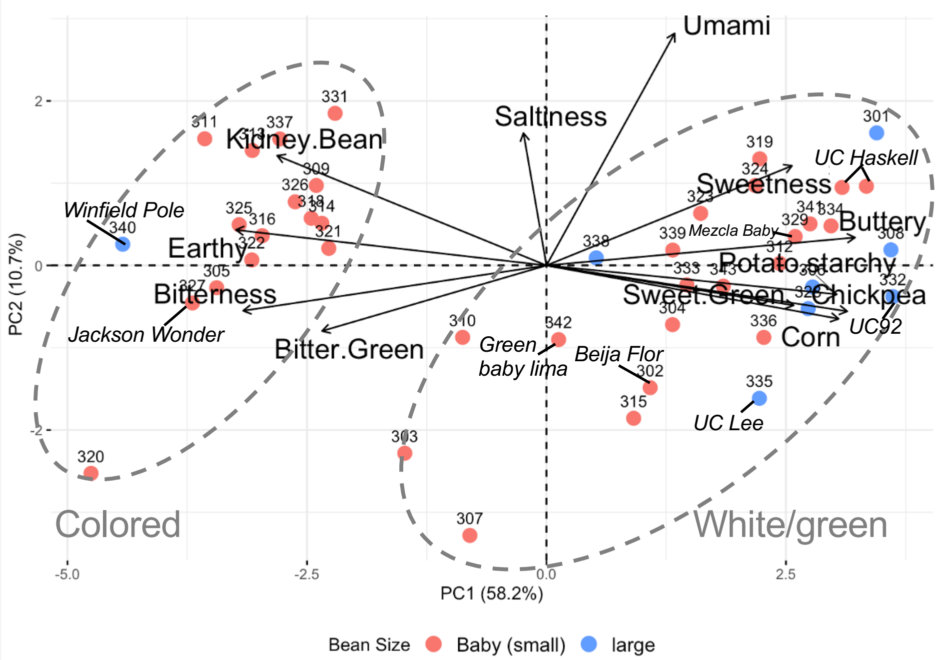
TASTE

- Sweetness
- Bitterness
- Saltiness
- Umami

APPEARANCE

- Wrinkle/vein
- Damage
- Speckles
- Individual size
- Size variation in sample cup

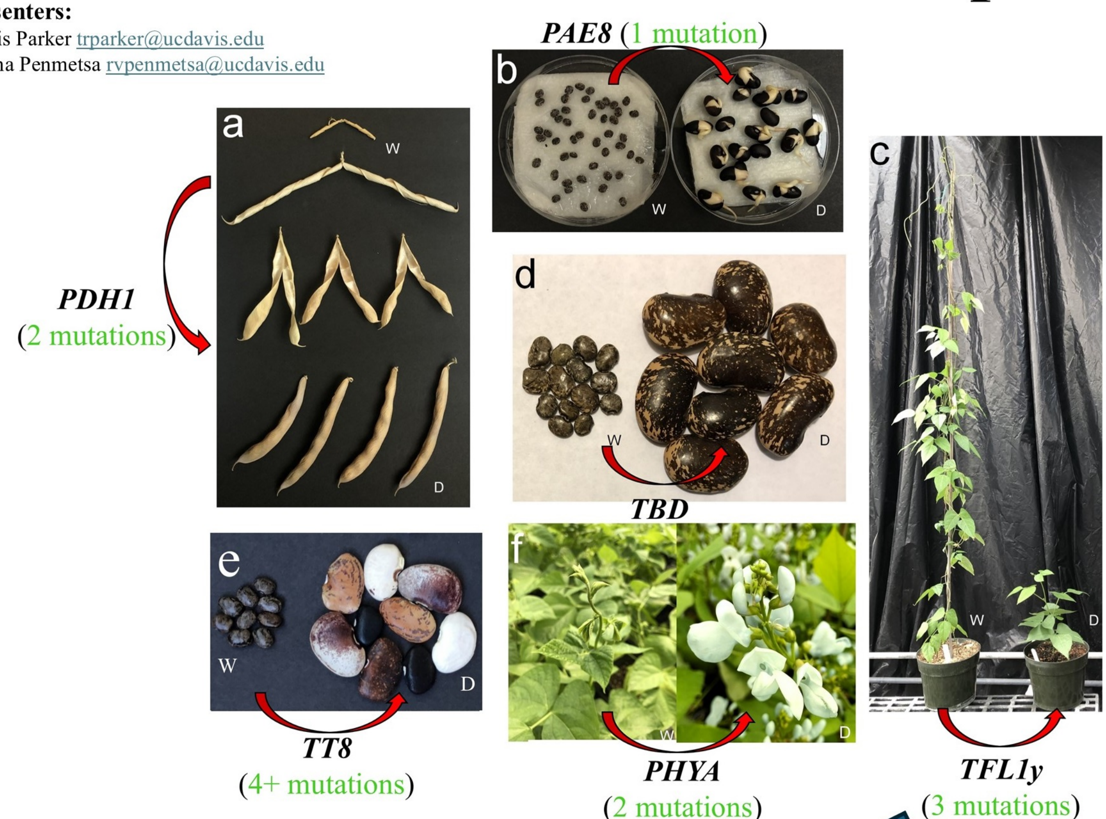
Flavor/Taste Attributes by Lima Size and Color



Large seeded types have stronger flavors than baby seeded limas. White/green seeded limas have more sweet flavors compared to darker colored, which tend to be more bitter.

Lima bean domestication & adaptation genes

Presenters:
Travis Parker trparker@ucdavis.edu
Varma Penmetsa rvpenmetsa@ucdavis.edu



a. Reduced shattering

b. Reduced seed dormancy

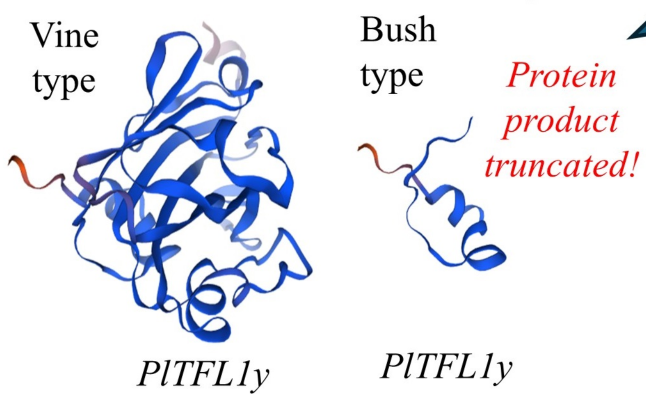
c. Compact growth

d. Harvested organ gigantism

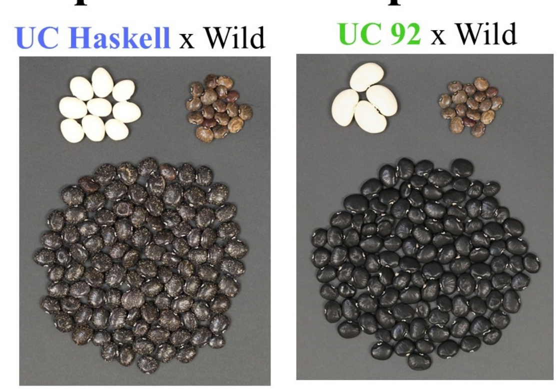
e. Visual diversification

f. Environmental sensitivity (flowering)

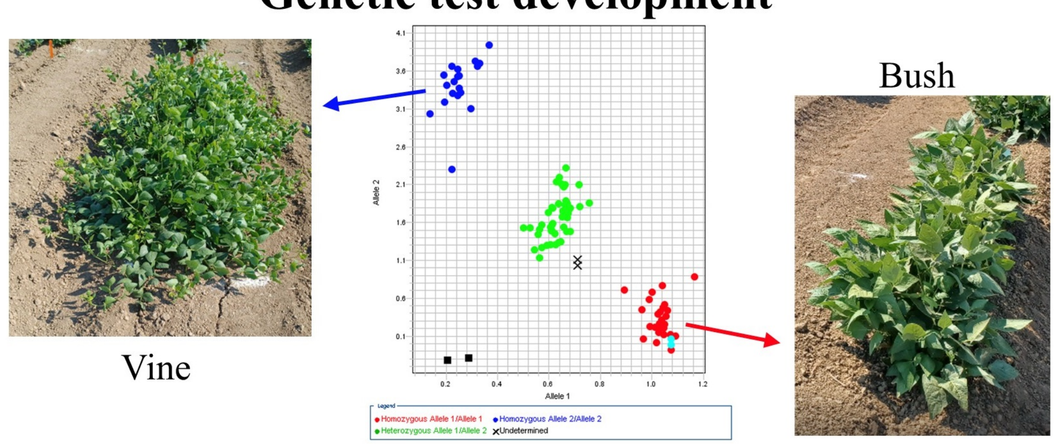
Mutation effect modeling



Population development



Genetic test development



2024 Blackeye Bean Variety Evaluation – Stanislaus County

Project team from UC Riverside, UC Davis, UC Cooperative Extension

Handout prepared by Michelle Leinfelder-Miles, San Joaquin County and Delta Farm Advisor

We evaluated blackeye bean varieties in a commercial field in Stanislaus County. Seven varieties from the UC Riverside blackeye breeding program were planted on July 1st. The varieties were grown on a well-drained, sandy loam, and the soil temperature was approximately 74°F at the time of planting. Each variety was planted across twelve 30-inch beds, on a row length of approximately 450 feet. The seeding rate was 40 pounds per acre. This was a non-replicated evaluation; therefore, no statistical analysis is presented.

The trial was planted in a field of CB46, and fertility and pests were managed by the grower in the same manner as the field. Data are presented in Table 1. Stand counts were made approximately two weeks after planting on July 16th. The stand was assessed as the number of plants per two-foot length. Twelve replicate counts were averaged. We evaluated aphid and lygus damage on August 16th, which were low due to the grower's management, and we also scouted for diseases but observed none. For lygus, we took 10 sweeps from four locations in each plot and counted the lygus. Data were averaged and are presented as a 10-sweep count. For aphids, we used a rating scale from 0 to 10 that accounted for visible crown damage and aphid incidence. In addition to the in-field assessment of lygus, we also evaluated harvest samples for stings and found that, on average, about 3 percent of the beans had lygus damage.

We harvested on October 15th. All twelve rows of each variety were harvested and weighed. The advanced breeding line CB2 outperformed the other varieties at this trial location. It has stronger nematode resistance compared to the industry standard, CB46, so potentially nematode pressure was impacting the yield of other varieties at this loation. The aim is to register CB2 this year, putting it on the path for commerical use. CB77 is a newly registered, aphid-resistant line that also performed well and will be available for certified seed production.

Acknowledgements:

We thank Martin Squires for cooperating with us on this trial, the CA Crop Improvement Association for funding regional trials, and to the CA Dry Bean Advisory Board for guiding research priorities.

Table 1. Stanislaus blackeye trial results.

Variety	Stand Count (plants/ac)	In-field Lygus Counts (#)	In-field Aphid Score	Beans with Lygus Stings at Harvest (%)	Weight at Harvest (g)	Harvest Moisture (%)	Yield at 13% moisture (lb/ac)
CB2	86394	6	1	2	22.3	12.3	2611
CB74	79860	8	0	2	23.2	10.9	2455
CB46	76956	4	0	2	21.9	11.9	2346
CB77	83490	5	0	3	21.1	11.0	2221
CB50	72600	7	0	3	24.2	12.1	1950
CB69	82038	8	0	4	22.0	12.1	1803
CB5	76230	3	0	7	24.3	12.4	1796

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2024 Blackeye Bean Variety Evaluation – UC Davis

Project team from UC Riverside, UC Davis, UC Cooperative Extension

Handout prepared by Michelle Leinfelder-Miles, San Joaquin County and Delta Farm Advisor

We planted a small-plot replicated blackeye bean variety trial on the UC Davis campus on May 24th. Nine varieties were planted, including three industry standards, one newly released cultivar, and five advanced breeding lines. The plots were 5-feet wide by 20-feet long, with two rows of beans planted down the bed. Each plot was planted with 160 non-inoculated seeds. Fertilizer and pest management were applied consistently across all plots. The soil type at the site is a Yolo silt loam, and the soil temperature was approximately 65°F at planting. Seasonal weather conditions were marked by 22 days with a maximum air temperature that met or exceeded 100°F.

Stand counts were made on June 26th. The stand was assessed by counting all live plants per plot. Flowering was observed in July and early August and recorded as the number of days after planting. The trial was harvested on October 4th. The plots in their entirety were harvested, and samples were sieved on-site to remove debris and then weighed. Seed moisture was measured on the same day. We evaluated 100-seed weight as a measure of seed size, evaluating five 100-seed samples per variety.

There were significant differences among varieties for stand count, flowering, and 100-seed weight (Table 1). Variety 07KN-74 had a significantly lower stand count than nearly all of the other varieties, but this did not impact yield, indicating that the plants were able to fill the beds and produce a large crop. Experimental line 2020-012-026-064-07 took significantly longer to reach flowering, particularly compared to industry standard CB46. Varieties CB5 and CB50 had the largest seed size of all the varieties, and newly-released CB77 had the smallest. CB50 had the highest harvest yield among the varieties (though not statistically different), but it was also impacted by lygus more than some of the newer material. CB77 and soon-to-be-released N2 yielded higher than industry-standard CB46 and had slightly lower lygus damage (though not statistically different).

Acknowledgements:

We thank the CA Crop Improvement Association for funding regional trials and the CA Dry Bean Advisory Board for guiding research priorities.

Table 1. UC Davis blackeye trial results. Data for each variety are expressed as the average across four replications.

Variety/Line	Stand Count (plants/ac)		Flowering (days after planting)*		Beans with Lygus Stings at Harvest (%)	100-seed Weight at Harvest (g)		Harvest Moisture (%)*	Yield at 13% moisture (lb/ac)	
CB50	38986	a	52	ab	19	27.9	a	9.8	1792	a
07KN-74 (CB74)	19275	b	49	b	17	27.0	ab	10.3	1747	a
N2 (CB2)	33106	ab	53	ab	14	24.2	cd	9.7	1581	a
20KN-069-6-1 (CB69)	39313	a	50	b	17	24.8	bcd	11.7	1538	a
CB77	40947	a	50	b	16	23.5	d	9.0	1509	a
CB5	44649	a	53	ab	22	27.6	a	9.8	1395	a
CB46	43233	a	47	b	18	23.8	cd	10.4	1319	a
2020-012-026-064-05 (BE1962)	41382	a	56	ab	14	25.1	bcd	10.4	1098	a
2020-012-026-064-07 (BE1963)	44976	a	68	a	13	25.9	abc	10.3	1014	a
Average	38430		53		17	25.5		10.2	1444	
Coefficient of Variation (%)	9.8		5.5		20.1	2.0		8.4	11.8	
Significant Variety Effect (P value)	0.0003		0.0060		0.3816	<0.0001		0.2693	0.0409	

2025 UC Davis Dry Bean Field Day

Weed identification and weed management in dry beans

Giuliano Galdi, UCCE Merced, Stanislaus and San Joaquin Counties

1. Check the Plant's Growth Stage

- **Seedling vs. Mature Plant** – Many weeds look very different as seedlings than at maturity. Try to find plants at various stages for a complete ID.
- **Flowering and Seed Head** – Flowers and seed heads are often the most reliable features for species-level ID.

Redroot pigweed (left), Johnsongrass (middle) and field bindweed (right) seedlings (top) and mature plants (bottom)

Broadleaves

Grasses

Sedges

2. <u>Sort them in 3 major categories</u>

- Broadleaf vs. Grass vs. Sedge
- **Look at Leaf Shape, Arrangement, and Venation**
  - Arrangement – Opposite, alternate, or whorled on the stem.
  - Margin – Smooth, toothed, lobed.
  - Venation – Parallel veins (grasses) or netted veins (broadleaf).

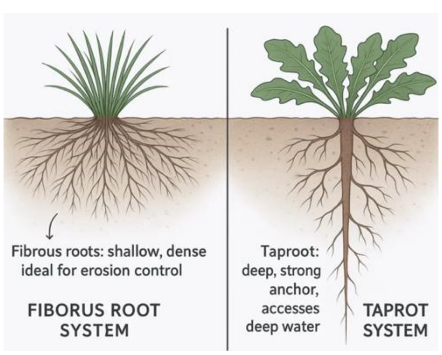
- **Examine the Stems** - Hollow vs. Solid – Many grasses have hollow stems between nodes; sedges are solid
  - Shape – Round, square, or triangular in cross-section.

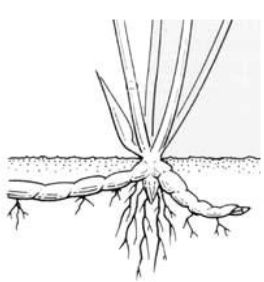
4. Check for Hairs or Other Surface Features

- **Location of hairs and other traits** – Hair on leaves, stems, sheaths, collar or waxy coating, sticky exudates (dandelion, milkweed, spurges), spines

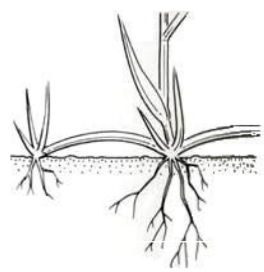
Prickly lettuce (left) and Bermudagrass (Hairy collar)

5. Inspect Roots or Underground Structures

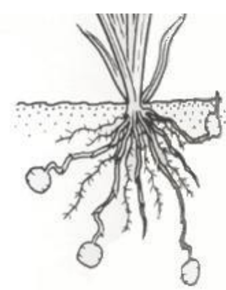




Rhizome



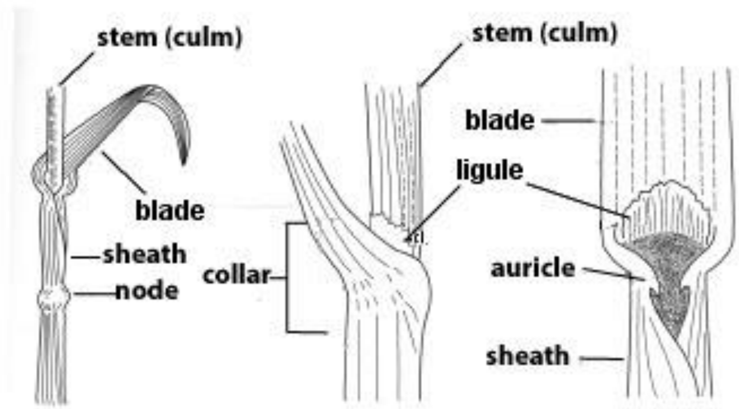
Stolon



Tubers

6. Look at Ligules, 6Auricles, and Sheaths (Grasses/Sedges)

- **Ligule** – Membranous, hairy, or absent where the leaf blade meets the sheath.
- **Auricles** – Small ear-like projections around the stem.
- **Sheath** – Open or closed around the stem.



7. Consider Habitat and Season

- Certain weeds prefer **specific soil types**, **moisture conditions**, and **seasonal windows**
- Annual, biennial, perennial
- Example: **Yellow nutsedge** (perennial)→ thrives in moist, poorly drained soils. **Palmer amaranth** (summer annual) → favors warm, fertile, well-drained soils.

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8. Compare to Reliable References

- Use **regional weed ID guides**, herbarium databases, or reputable online tools (WRIC website, apps, books, even iPhone library can help).
- Take **clear photos** of leaves, stems, flowers, and roots for later verification. Try to "mute" the background.

2025 Blackeye Bean Variety Evaluation – UC Davis

Project team from UC Riverside, UC Davis, UC Cooperative Extension
Handout prepared by Michelle Leinfelder-Miles and Bao-Lam Huynh

We planted an unreplicated trial of blackeye varieties and elite lines at UC Davis, complementing strip trials in commercial fields in Stanislaus and Tulare counties. Collectively, these trials allow us to evaluate performance across environments. The UC Davis trial was planted on May 23, 2025 and is depicted in Figure 1. Approximately 60 seeds were planted per 5-ft by 10-ft plot. Stand counts were made about one month after planting, and flowering was observed from mid-July through early August. Variety traits are depicted in Table 1. Final results will be available at the end of the year.

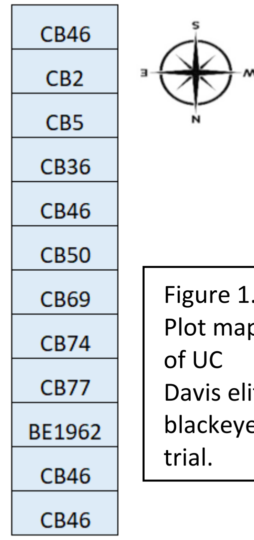


Figure 1. Plot map of UC Davis elite blackeye trial.

Acknowledgements:

We thank the CA Crop Improvement Association, CA Dry Bean Advisory Board, and Foundation for Food and Agriculture Research for their support.

Table 1. Description of blackeye bean entries for 2025 regional trials.

Entry	Line Name	Characteristics
CB5	California Blackeye 5	Blackeye cultivar (industry standard), large seed, resistant to *M. incognita* nematode, susceptible to aphid and Fusarium wilt diseases
CB46	California Blackeye 46	Blackeye cultivar (industry standard), resistant to *M. incognita* nematode and Fusarium race 3, susceptible to aphid and Fusarium race 4
CB77	California Blackeye 77	Blackeye cultivar (newly released), CB46 background, resistant to aphid, *M. incognita* nematode and Fusarium wilt race 3
CB50	California Blackeye 50	Blackeye cultivar (industry standard), large seed, resistant to Fusarium wilt races 3 and 4, susceptible to aphid
CB2	N2	Advanced breeding line, CB46 background, stronger nematode resistance than CB46
CB69	20KN-069-6-1	Advanced breeding line, lygus tolerance
CB74	07KN-74	Advanced breeding line, lygus tolerance
BE1962	2020-012-026-064-05	Advanced breeding line, CB5 background, resistant to aphid, *M. incognita* nematode and Fusarium wilt races 3 and 4
CB36	2016-017-036-4-3	Advanced breeding line, resistant to aphid, *M. incognita* nematode and Fusarium wilt races 3 and 4

Targeted selection of cowpea seed size

- Cowpea seed size is an important trait for producers to meet market demands.
- Seed size is controlled by multiple genetic regions
- Identification of regions controlling seed size can hasten selection of cowpea for grower benefit.

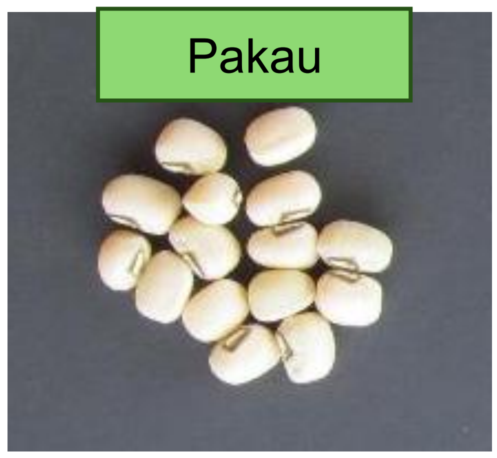
Main objective: Identify and introgress (bring in through cross-pollination) genetic regions underlying large seed size into elite line that has previously been bred to have disease resistance and high yield, among other useful traits.

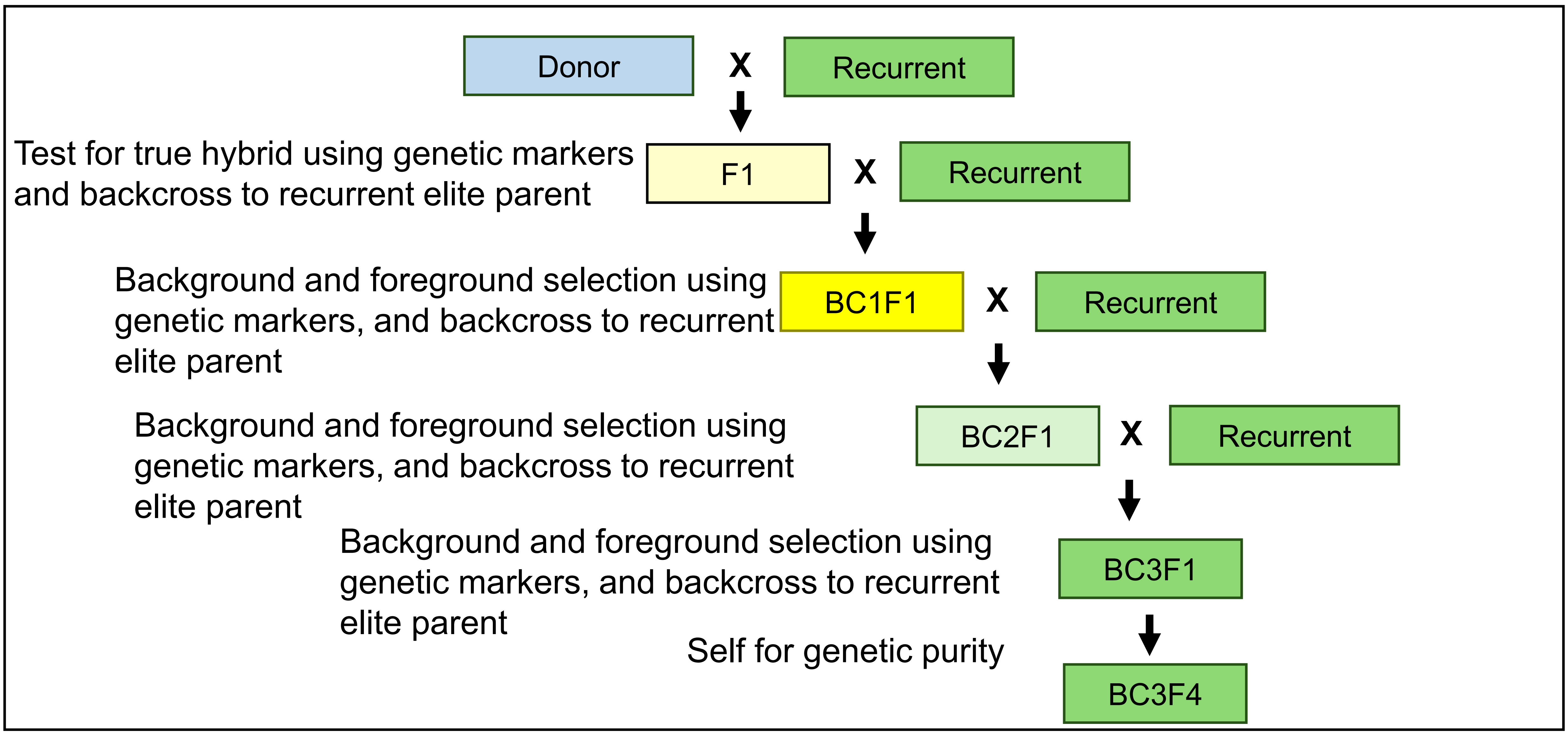
Large-seeded donor parent:

100-seed weight = 27g

Small-seeded elite recurrent parent:

100-seed weight = 18g





Final result:

Two genetic regions were identified. Nine improved lines were developed with differing combinations of these two identified regions. Follow-up studies include assessing the agronomic performance and nutritional quality of these nine lines alongside the two parents pictured above.