

2023 University of Minnesota Processing Pea Variety Trial

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Average yield (#/Ac)		
	Early	Main
2023	3333	3504
2022	3427	4134
2021	2079	2242
2020	2803	3381
2019	2595	3086
2018	3769	3267
2017	4791	3799
2016	6064	5648
2015	5422	5179
2014	1760	2082
2013	3951	3770
2012	3199	3313
2011	2452	4185
2010	5022	5178
2009	4122	6155

Summary

Average pea yields in the 2023 trial were good. Precipitation after May was low and we were in a drought most of the summer, but over 6 inches in early May and a sprinkle in late June seemed sufficient for our crop. The May rain flooded a small number of early-planted plots. Unlike 2021–2022, there were no nights with high temperatures above 70°F. Giant ragweed pressure was very high in some parts of the field. In addition to hand-weeding, Basagran 5L (1.6 pt / ac) was spot-applied to both plantings prior to flowering.

Design

Peas were planted in plots 10- by 42-feet in a randomized complete block design with 3 replicates. Planting rate was 600,000 seeds per acre based on provided seed counts. Seeds were planted as provided, with various treatments. Pre-emergent herbicide (Optill®) and 50 #/Ac N (urea) were incorporated prior to planting. We had 23 entries in our early-planted trial (27 April) and 33 entries in our main-season trial (16 May). Harvest was targeted when a bulked sample of 1 m² from each triplicate plot per entry was at a tenderometer reading of 100–110.

Stand counts (per m²) were recorded for each plot at that time. Harvested area from each plot for yield and sieve size analysis was 3 m². Yields were adjusted based on tenderometer readings to provide adjusted yield:

Adjusted Yield = Yield + [28 × (100 - Tenderometer)]. Canopy height, length of individual plants, and node of lowest pod were recorded just after harvest, 5 times per plot. Weather was recorded using an on-station weather monitor. Sieve size is reported as the sum of (sieve number × weight percent of sample added to sizer).

Results

Results are presented in tabular form by planting season and graphically by seed company. The following graphs are provided:

- **Tenderometer at harvest.** Targeted tenderometer (90-120) is indicated, and individual replicates are displayed.
- **Adjusted yield.** Data from individual plots and overall average are shown. Shaded area represents quintiles from raw data for each planting; 20% of yields were in Q1, 40% of yields were less than Q3 and 40% were greater than Q3, etc.
- **Heat units.** Accumulated heat units from planting (40°F base temperature)
- **Sieve range and sieve size.** Sieve range of each entry is plotted using a diverging stacked chart, centered between sieve size 3 and 4. Calculated sieve index is displayed.
- **Canopy height, vine length, and node number.**
- **Daily temperature and cumulative daily precipitation.** Tabular data is also provided. In tabular data, GDU are calculated with base temperature of 50°F, not 40°F.

Source	Variety	Plants/Acre	Yield (lbs/acre)	Adjusted Yield (lbs/acre)	Tenderometer	Sieve Size Index	Heat Units	Harvest Date	Canopy Height (inch)	Vine Length (inch)	Lowest pod node
Brotherton	EXP069	628,603	4,803	4,168	123	4.37*	1549	26-Jun	12.5	12.8*	12.5*
Brotherton	EXP455	669,071	3,070	2,809	109	4.10	1338	20-Jun	10.8	9.4*	9.1*
Brotherton	EXP525 [†]	568,575	4,397	3,865	119	3.88	1610	28-Jun	13.3*	15.2*	15.0*
Brotherton	EXP776	616,463	3,726	4,053	88	3.79	1452	23-Jun	10.9	11.9	12.1*
Brotherton	EXP795	569,250	3,687	3,239	116	4.30*	1300	19-Jun	10.7	10.2	9.7*
Crites	CS-504AF [†]	579,704	1,763	1,791*	99	4.33*	1235	17-Jun	9.8	10.1	8.5*
Gallatin Valley	435	655,582	3,375	3,459	97	3.99	1300	19-Jun	10.3	9.7	9.6*
Gallatin Valley	518	625,905	3,169	3,169	100	4.05	1452	23-Jun	11.0	10.3	10.3
Gallatin Valley	1648	682,560	3,671	3,269	114	3.86	1300	19-Jun	10.8	10.0	9.4*
Gallatin Valley	1751	627,254	3,871	3,507	113	4.25*	1300	19-Jun	8.6*	9.7	9.4*
Gallatin Valley	8035	590,833	3,615	3,345	110	4.21	1338	20-Jun	10.6	10.2	9.9
Gallatin Valley	AUSTIN	573,297	2,805	2,889	97	4.15	1300	19-Jun	9.6	9.7	10.9
Gallatin Valley	DAKOTA	689,305	3,167	3,009	106	4.15	1235	17-Jun	7.3*	9.8	7.7*
Gallatin Valley	FP2269	615,114	2,505	2,739	92	4.51*	1235	17-Jun	9.1*	9.1*	8.1*
PureLine	98-356	628,603	2,484	2,436*	102	4.13	1300	19-Jun	9.4	8.0*	9.8*
PureLine	Bonfire	503,152	2,321	2,526	93	3.47*	1235	17-Jun	8.2*	9.0*	7.3*
PureLine	DGL-0027	559,807	3,138	3,259	96	3.67	1375	21-Jun	11.4	12.1	11.1
PureLine	Eldorado	569,250	2,422	2,683	91	3.76	1181	15-Jun	6.4*	11.8	7.9*
PureLine	PLS 613-89 [†]	491,686	2,753	3,145	86	2.37*	1375	21-Jun	11.5	10.1	10.2
PureLine	Saltingo	721,679	3,377	3,340	101	3.93	1452	23-Jun	10.6	12.7*	10.8
Seminis	DA1470	561,156	4,606	4,289*	111	3.72	1549	26-Jun	12.4	12.1	12.0*
Seminis	Reliance	562,505	2,746	3,026	90	3.00*	1452	23-Jun	12.3	10.9	12.4*
Seminis	SV0823QG	608,369	4,910	4,881*	101	3.75	1610	28-Jun	14.9*	13.9*	13.4*
Seminis	SV1231QF [†]	631,301	4,701	4,393	111	3.99	1644	29-Jun	14.4*	13.9*	14.0*
Seminis	SV6485QH	627,254	2,481	2,537	98	3.39*	1338	20-Jun	11.3	10.3	10.0
Seminis	SV6844QG	571,948	4,713	4,498*	108	4.23*	1644	29-Jun	13.9*	13.7*	15.2*
Seminis	SV7688QF	555,761	3,395	3,629	92	3.34*	1577	27-Jun	14.5*	13.8*	14.2*

Source	Variety	Plants/Acre	Yield (lbs/acre)	Adjusted Yield (lbs/acre)	Tenderometer	Sieve Size Index	Heat Units	Harvest Date	Canopy Height (inch)	Vine Length (inch)	Lowest pod node
	Average	604,944	3,395	3,333	102	3.89			10.8	11.1	10.7
	Upper Quartile	659,628	3,930	3,749	112.0	4.19			12.0	12.5	12.0
	Lower Quartile	562,505	2,738	2,765	94.0	3.62			9.6	9.6	9.2
	% CV	10	14	15	0.1	5.1			4.6	8.3	5.4

*Varieties significantly higher or lower than average for adjusted yield, sieve size, canopy height, vine length, and pod node are indicated, based on Holm-adjusted post-hoc t-tests ($\alpha=0.1$).

Peas were planted on 4/26/2023 in plots 10 feet wide and 42 feet long in 3 randomized complete blocks, targeting 600,000 seeds per acre.

[†]**These varieties only have 2 replicates due to flooded plots**

50 #/A nitrogen (urea) and 1.5 oz Optill / Ac (saflufenacil + imazethapyr) were incorporated prior to planting.

1 meter² per plot was manually harvested for stand count, and 3 meters² were harvested from each plot for yield, tenderometer, and sieve size.

Target harvest tenderometer reading was 100–110. Canopy height, vine length, and pod node were recorded 5 times per plot at harvest.

Source	Variety	Plants/Acre	Yield (lbs/acre)	Adjusted Yield (lbs/acre)	Tenderometer	Sieve Size Index	Heat Units	Harvest Date	Canopy Height (inch)	Vine Length (inch)	Lowest pod node
Brotherton	EXP612	272,485	3,120	3,157	99	3.78	1797	17-Jul	15.6	16.9	15.9*
Brotherton	EXP631	477,522	5,274	4,360	133	4.11*	1797	17-Jul	15.2	17.4	13.7
Brotherton	EXP649	400,633	4,707	4,689	101	4.21*	1797	17-Jul	12.9	15.3	14.5
Brotherton	EXP710	396,586	3,786	3,907	96	3.57	1797	17-Jul	15.6	18.0*	15.5*
Brotherton	EXP793	454,591	3,722	3,834	96	4.04*	1797	17-Jul	13.3	15.0	14.3
Crites	CS-468AF	512,595	3,958	3,818	105	4.00*	1662	12-Jul	13.3	13.8	12.3
Crites	CS-492AF	384,446	3,165	3,193	99	3.22*	1532	7-Jul	13.9	12.8*	11.9*
Crites	CS-515AF	418,169	5,445	5,155*	110	4.05*	1818	18-Jul	15.0	17.5*	13.9
Gallatin Valley	522	447,846	3,643	3,540	104	3.70	1662	12-Jul	15.1	15.6	12.6
Gallatin Valley	1672	430,310	1,915	2,129	92	2.86*	1637	11-Jul	13.5	13.6*	13.9
Gallatin Valley	1697	408,727	2,682	2,626	102	3.03*	1662	12-Jul	12.1*	12.8*	13.9
Gallatin Valley	1846	495,059	4,036	3,774	109	3.38	1880	20-Jul	12.4	13.9	14.3
Gallatin Valley	1848	447,846	2,874	3,163	90	2.86*	1662	12-Jul	13.2	13.7	14.1
Gallatin Valley	4601	389,842	3,659	3,808	95	2.97*	1662	12-Jul	14.6	15.1	12.3
Gallatin Valley	5903	356,118	4,075	3,496	121	4.01*	1797	17-Jul	14.8	16.4	12.7
Gallatin Valley	8154	376,352	4,967	4,790	106	3.88*	1689	13-Jul	9.0*	13.4*	12.7
Gallatin Valley	8288	395,238	2,557	2,566	100	3.19*	1637	11-Jul	12.5	13.9	12.6
Gallatin Valley	FP2278	411,425	2,993	3,105	96	3.52	1662	12-Jul	12.8	13.6*	13.5
Gallatin Valley	RICCO	457,288	4,763	4,567	107	4.31*	1689	13-Jul	12.8	15.2	14.1
PureLine	98W-407	427,612	2,218	2,265	98	2.41*	1721	14-Jul	14.7	16.1	14.1
PureLine	Ballade	330,489	5,524	4,777	127	3.76	2068	26-Jul	18.7*	20.3*	18.3*
PureLine	Marquis	445,148	2,727	3,110	86	2.34*	1721	14-Jul	16.0*	17.7*	14.8
PureLine	PL 0065	414,123	4,386	4,312	103	3.96*	1689	13-Jul	14.5	15.0	12.5
PureLine	PL 0266	345,327	2,109	2,221	96	2.64*	1721	14-Jul	11.6*	15.3	13.7
PureLine	PLS 183	416,820	2,626	2,897	90	3.53	1721	14-Jul	17.4*	18.6*	14.1
PureLine	PLS 196	245,506	2,947	2,863	103	4.00*	1818	18-Jul	12.7	15.9	13.5
PureLine	PLS 251	221,225	5,119	4,829	110	4.24*	1880	20-Jul	13.4	17.3	14.1
PureLine	PLS 370	188,851	2,902	2,939	99	3.91*	1721	14-Jul	15.2	18.6*	13.7
PureLine	PLS 586-A	396,586	3,007	2,727	110	3.72	1662	12-Jul	12.0*	14.2	9.9*

Source	Variety	Plants/Acre	Yield (lbs/acre)	Adjusted Yield (lbs/acre)	Tenderometer	Sieve Size Index	Heat Units	Harvest Date	Canopy Height (inch)	Vine Length (inch)	Lowest pod node
PureLine	PLS 595	330,489	4,779	5,077	89	3.59	1689	13-Jul	13.7	17.4	12.5
PureLine	PLS 602	410,076	4,210	4,201	100	2.83*	1689	13-Jul	14.6	16.0	13.8
PureLine	PLS 648-3	379,050	4,248	3,436	129	4.73*	1797	17-Jul	14.1	16.9	13.9
Seminis	DA1470	362,863	2,967	2,678	110	3.64	1662	12-Jul	12.3	12.0*	12.5
Seminis	Reliance	364,212	3,266	3,136	105	3.23*	1662	12-Jul	12.9	13.3*	12.7
Seminis	SV0823QG	504,501	2,593	2,817	92	3.02*	1721	14-Jul	15.0	17.6*	14.1
Seminis	SV1231QF [†]	372,306	2,515	2,529	100	3.24	1721	14-Jul	14.3	17.4	14.6
Seminis	SV6485QH	420,867	2,606	2,084	119	3.61	1532	7-Jul	14.4	11.5*	11.2*
Seminis	SV6844QG	419,518	5,657	5,732*	97	4.53*	1880	20-Jul	14.9	17.1	14.7
Seminis	SV7688QF	411,425	3,425	3,145	110	3.58	1797	17-Jul	15.1	16.4	14.5
Seminis	SV0935QF	381,748	2,495	2,393	104	3.00*	1532	7-Jul	13.3	13.2*	11.3*
	Average	393,220	3,601	3,504	103	3.51			14.0	15.5	13.6
	Upper Quartile	453,242	4,436	4,364	109.0	3.97			15.0	16.9	14.4
	Lower Quartile	331,838	2,497	2,529	95.0	3.09			12.8	13.9	12.6
	% CV	19	26	25	1.6	4.0			6.9	7.2	6.0

*Varieties significantly higher or lower than average for adjusted yield, sieve size, canopy height, vine length, and pod node are indicated, based on Holm-adjusted post-hoc t-tests ($\alpha=0.1$).

Peas were planted on 5/19/2023 in plots 10 feet wide and 42 feet long in 3 randomized complete blocks, targeting 600,000 seeds per acre.

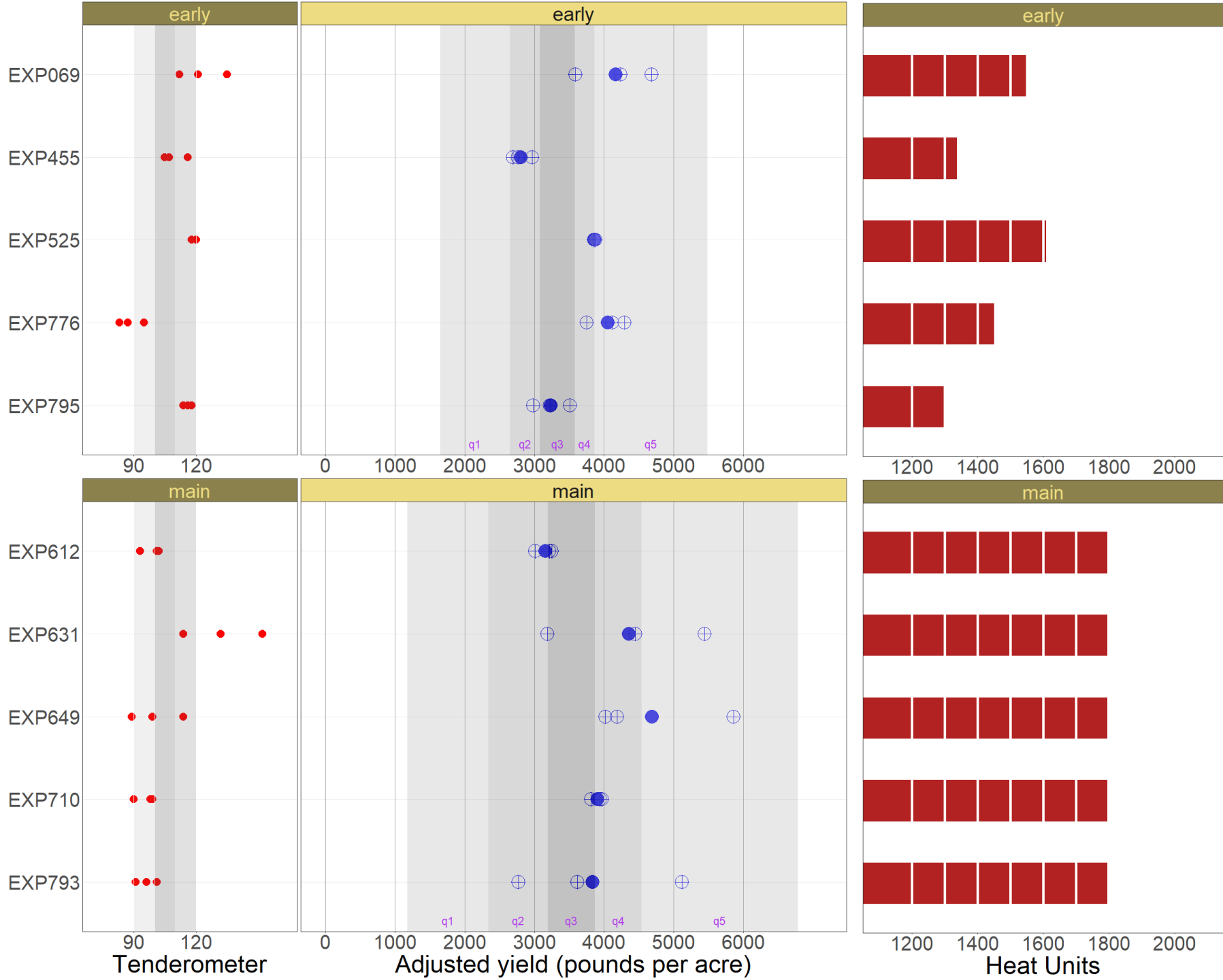
[†]2 replicates

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BROTHERTON

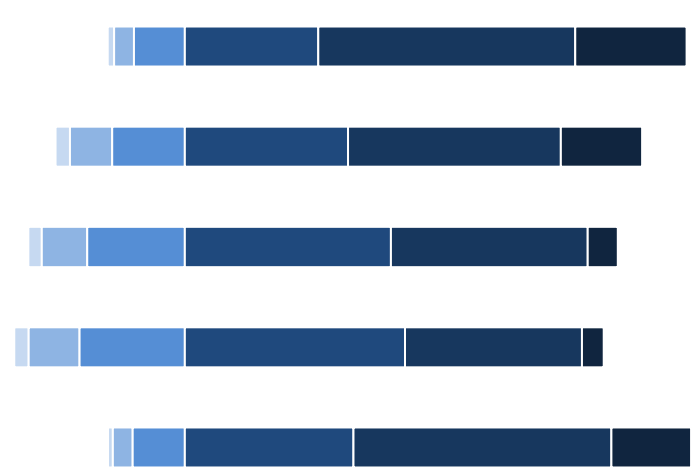


BROTHERTON

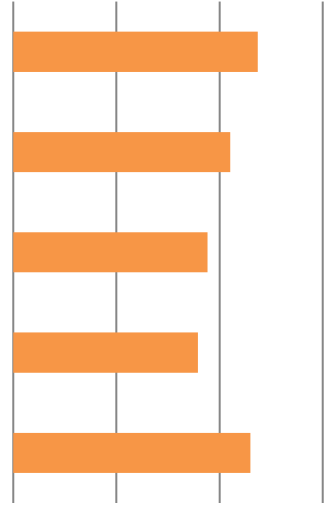
Sieve Size



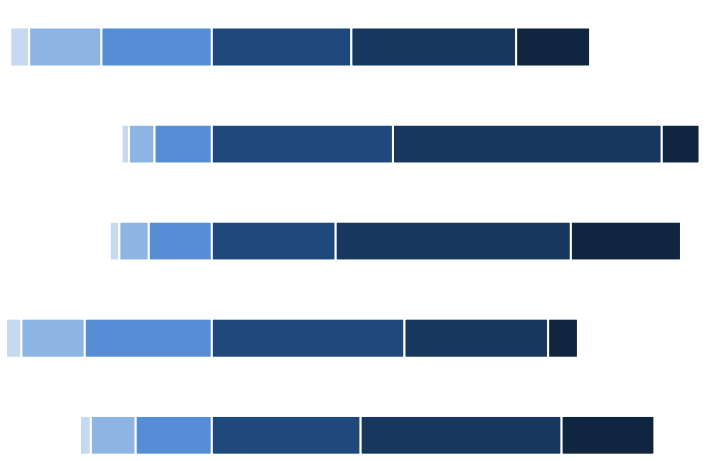
early



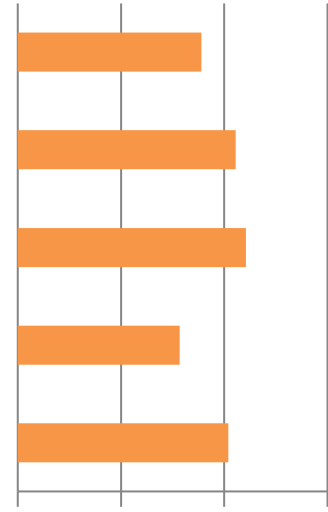
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EXP455
EXP525
EXP776
EXP795



main



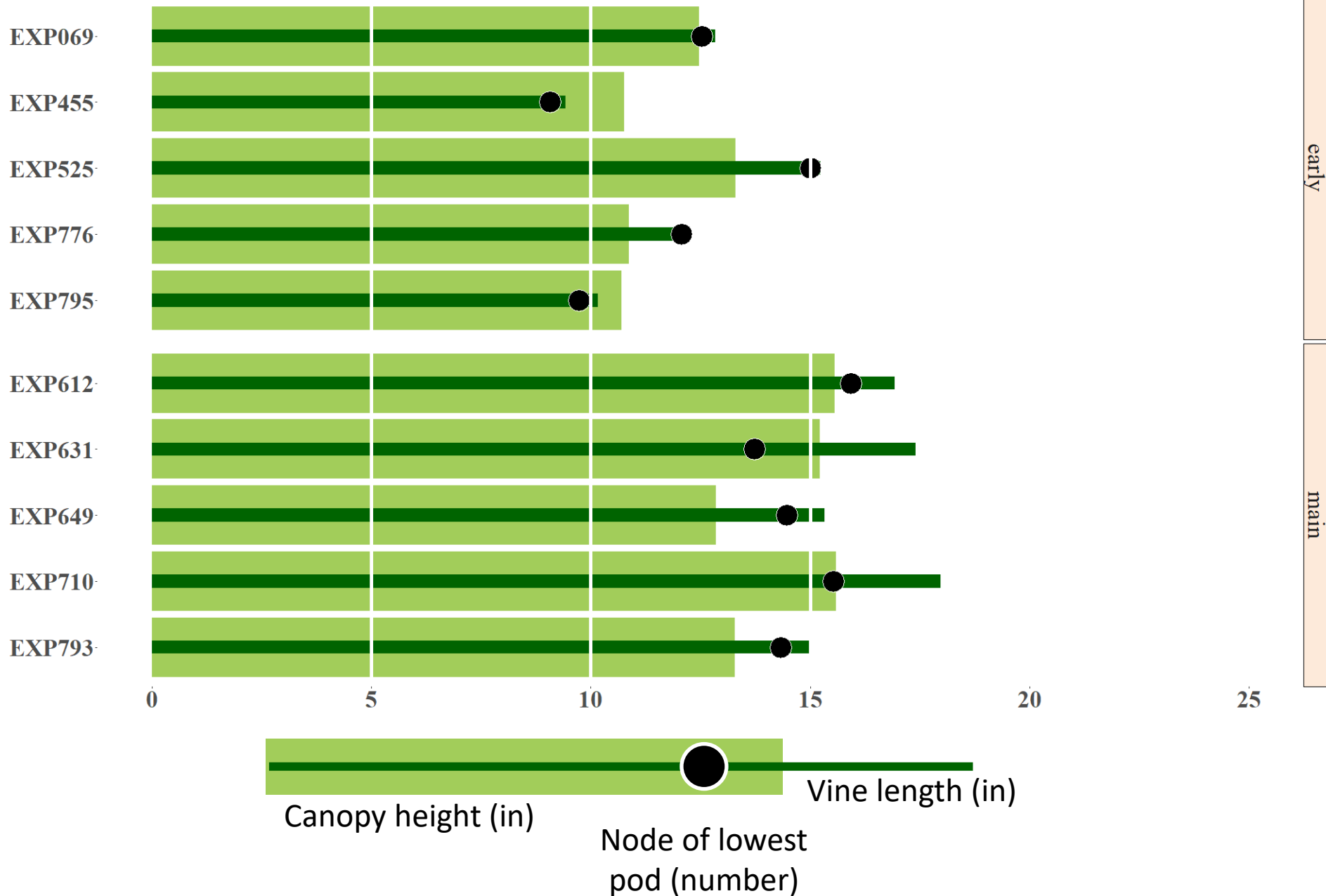
EXP612
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EXP649
EXP710
EXP793



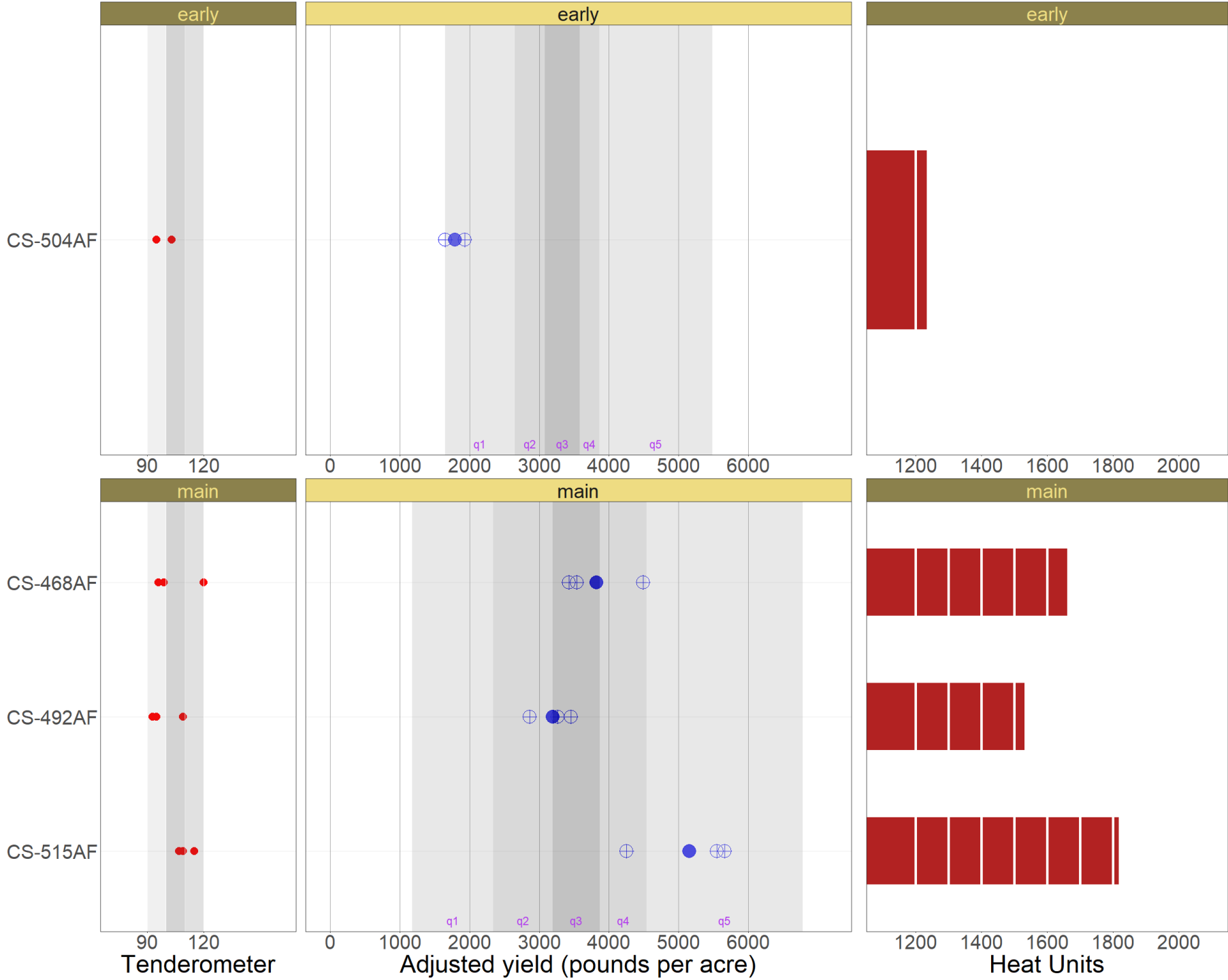
% of initial sieve sample

Sieve Index: 2 3 4 5

BROTHERTON



CRITES



CRITES

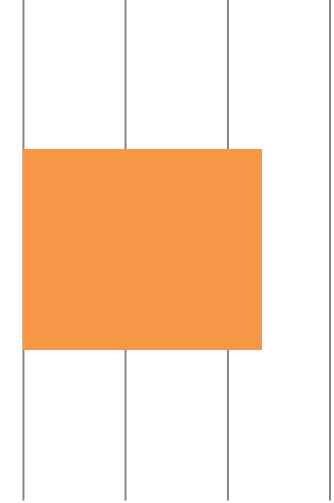
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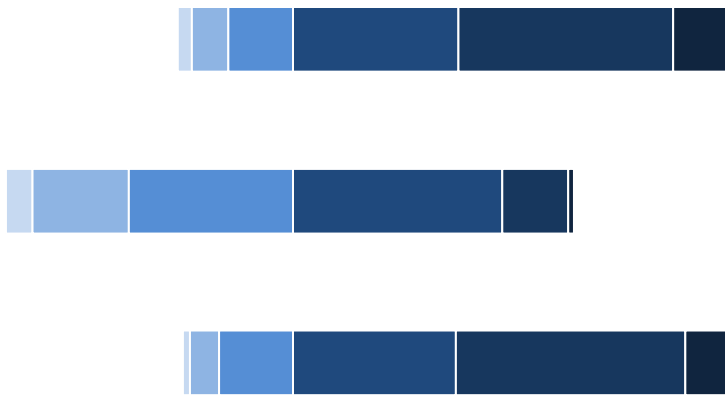
early



CS-504AF



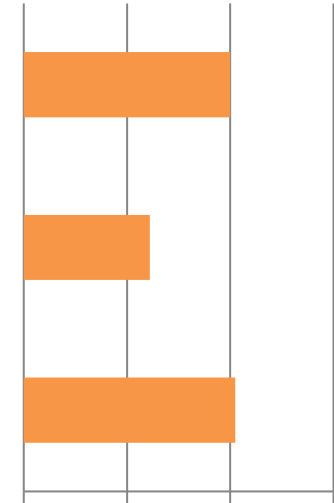
main



CS-468AF

CS-492AF

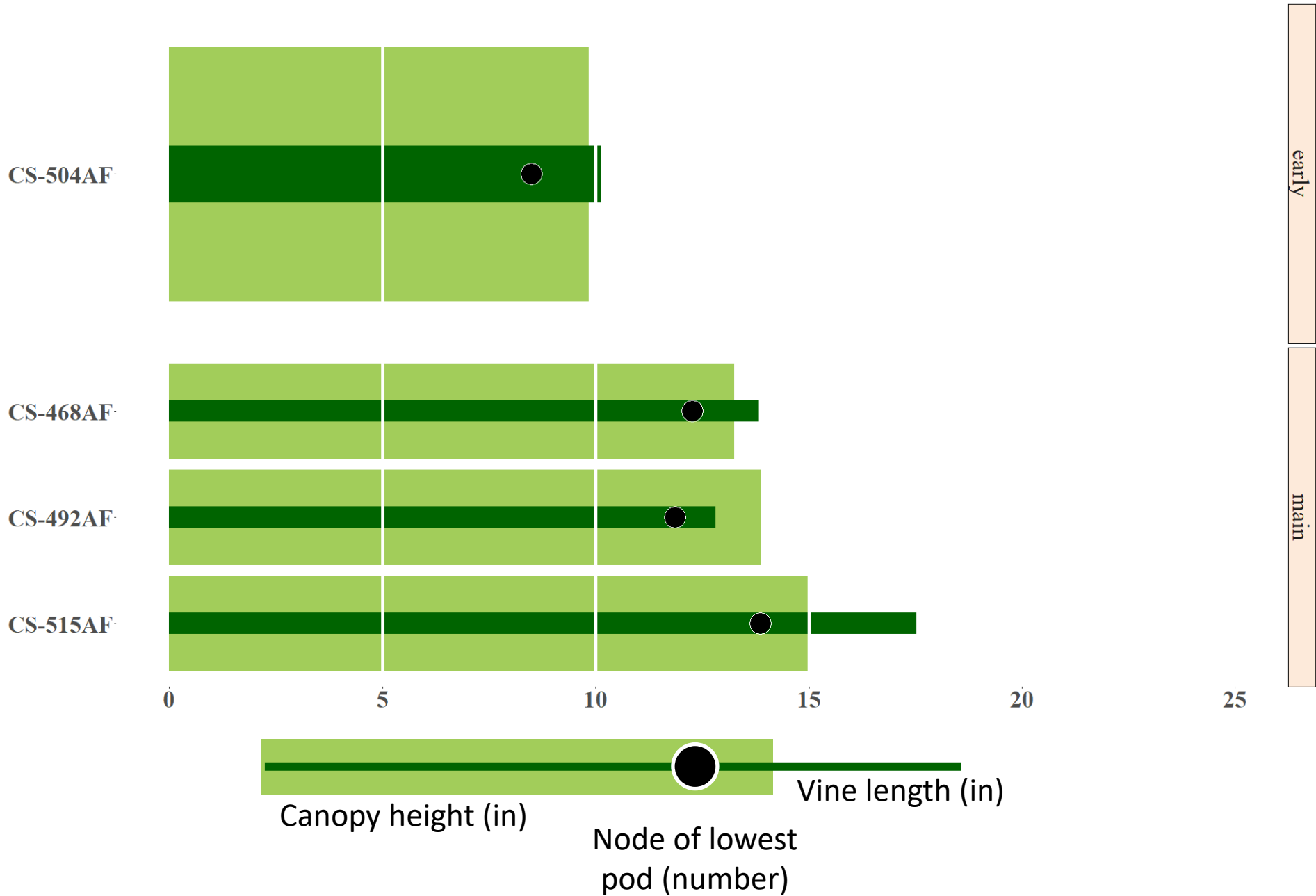
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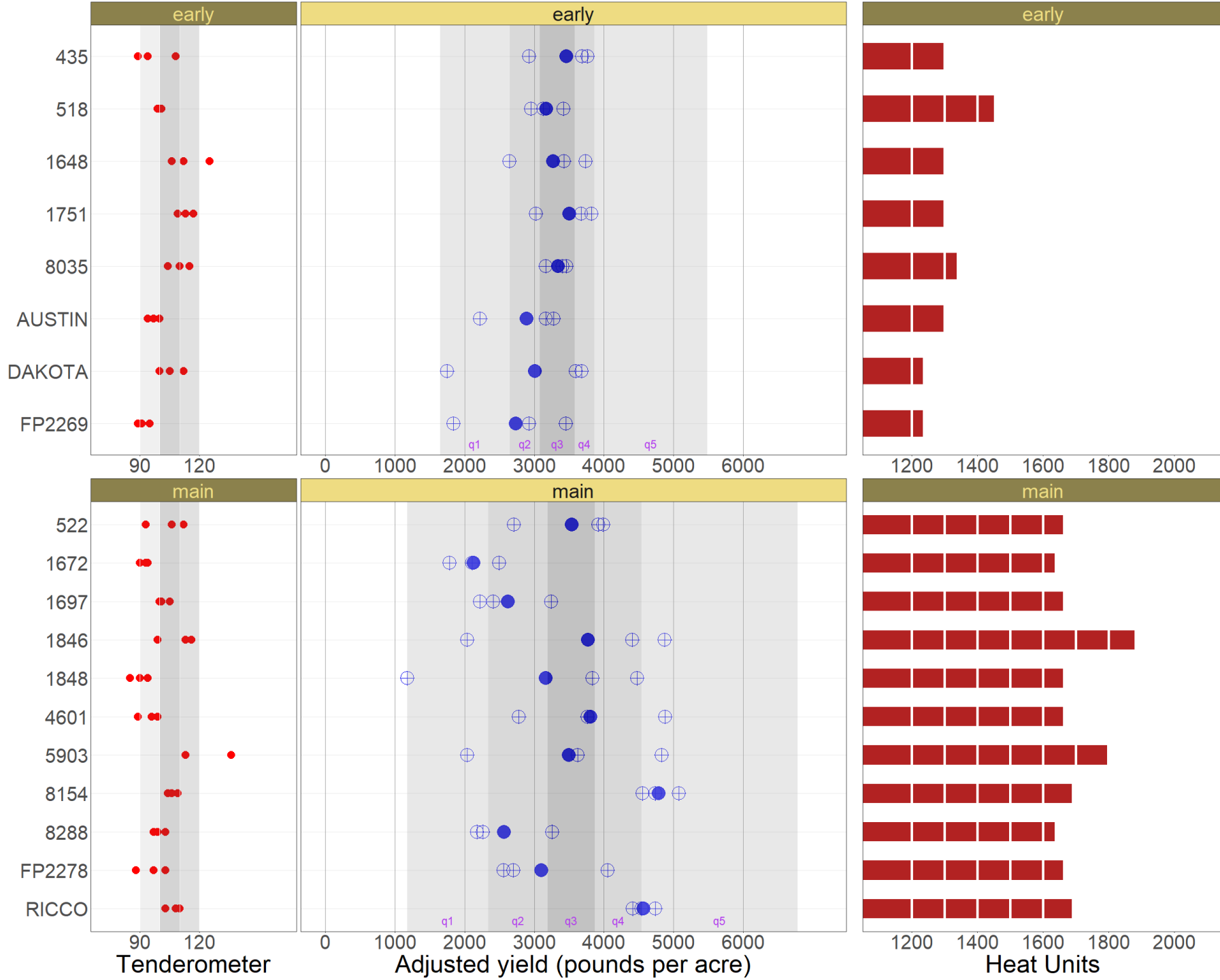
% of initial sieve sample

Sieve Index: 2 3 4 5

CRITES

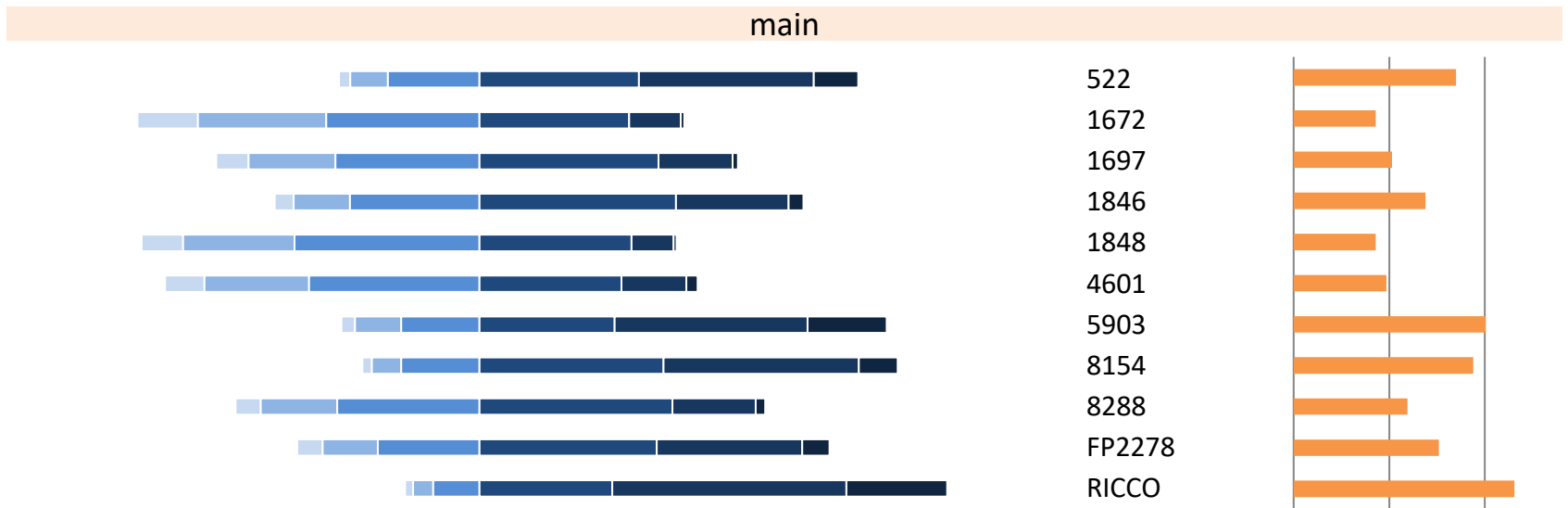
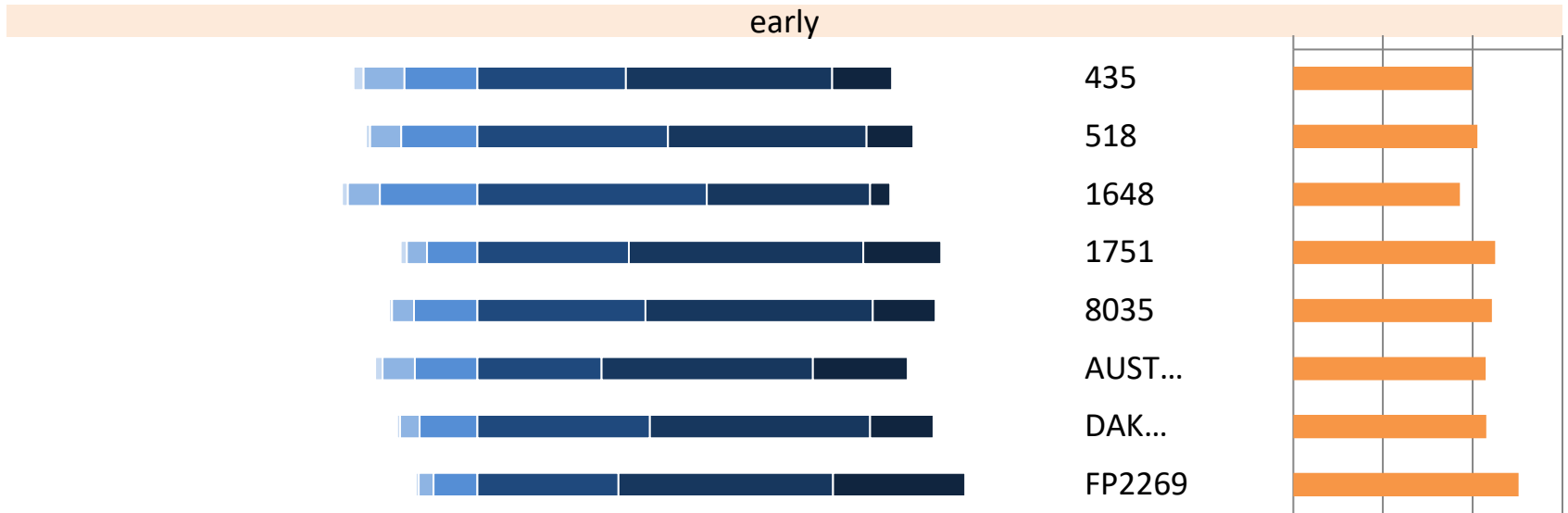


GALLATIN VALLEY



GALLATIN VALLEY

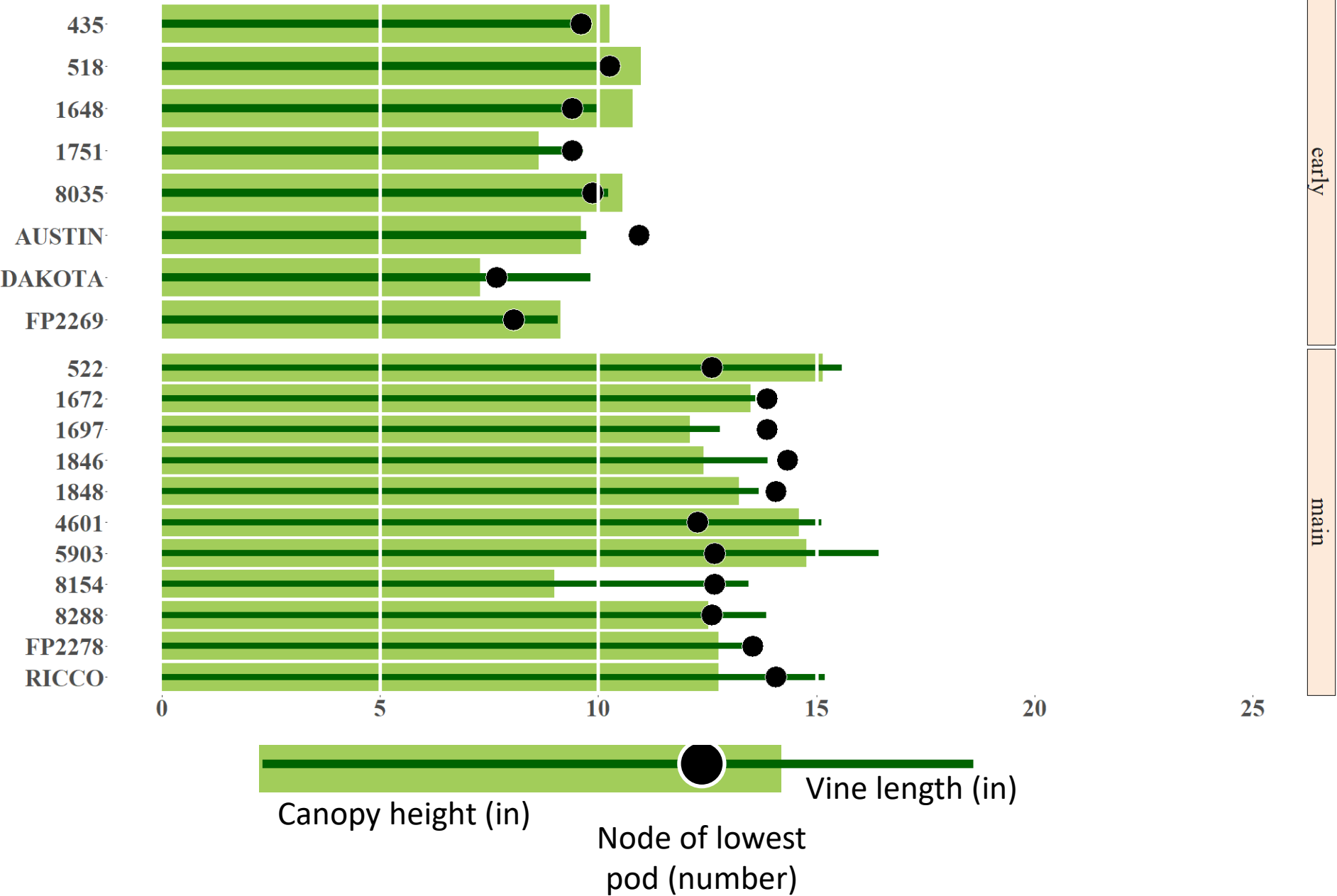
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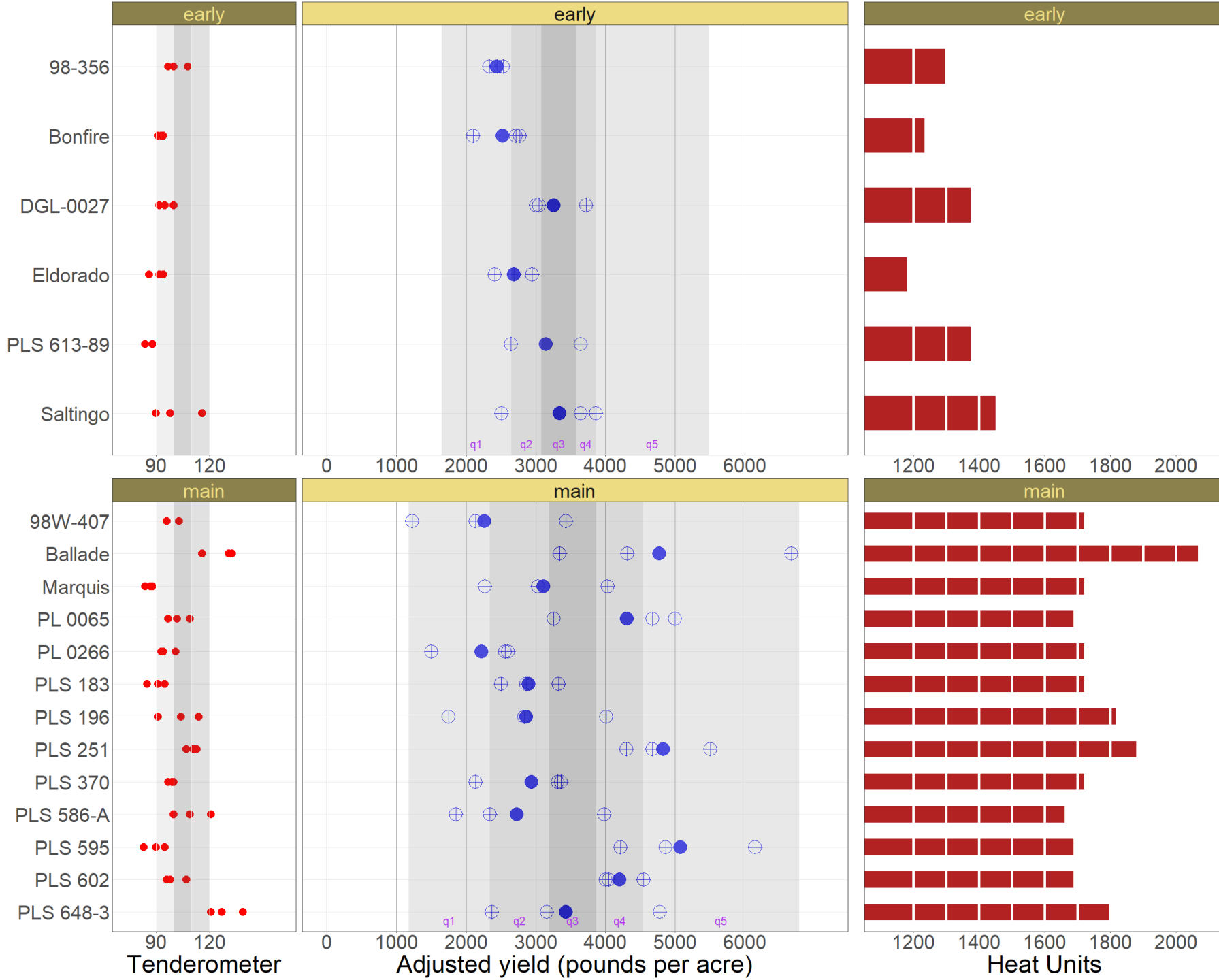
% of initial sieve sample

Sieve Index: 2 3 4 5

GALLATIN VALLEY



PURELINE

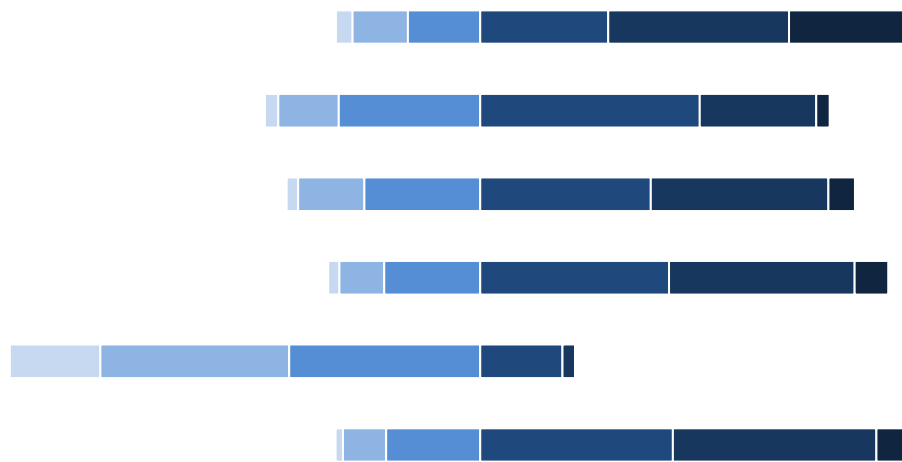


PURELINE

Sieve Size



early



98-356

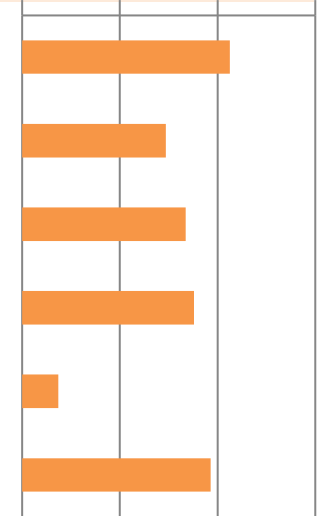
Bonfire

DGL...

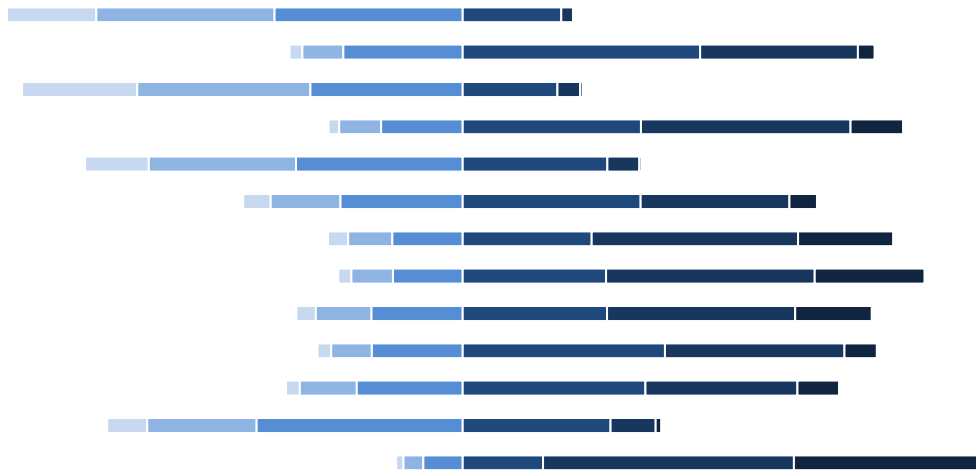
Eldorado

PLS...

Saltingo



main



98W-407

Ballade

Marquis

PL 0065

PL 0266

PLS 183

PLS 196

PLS 251

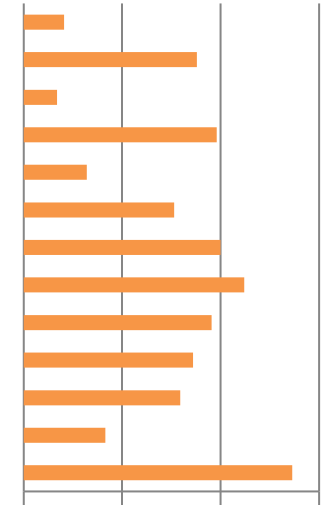
PLS 370

PLS 586-A

PLS 595

PLS 602

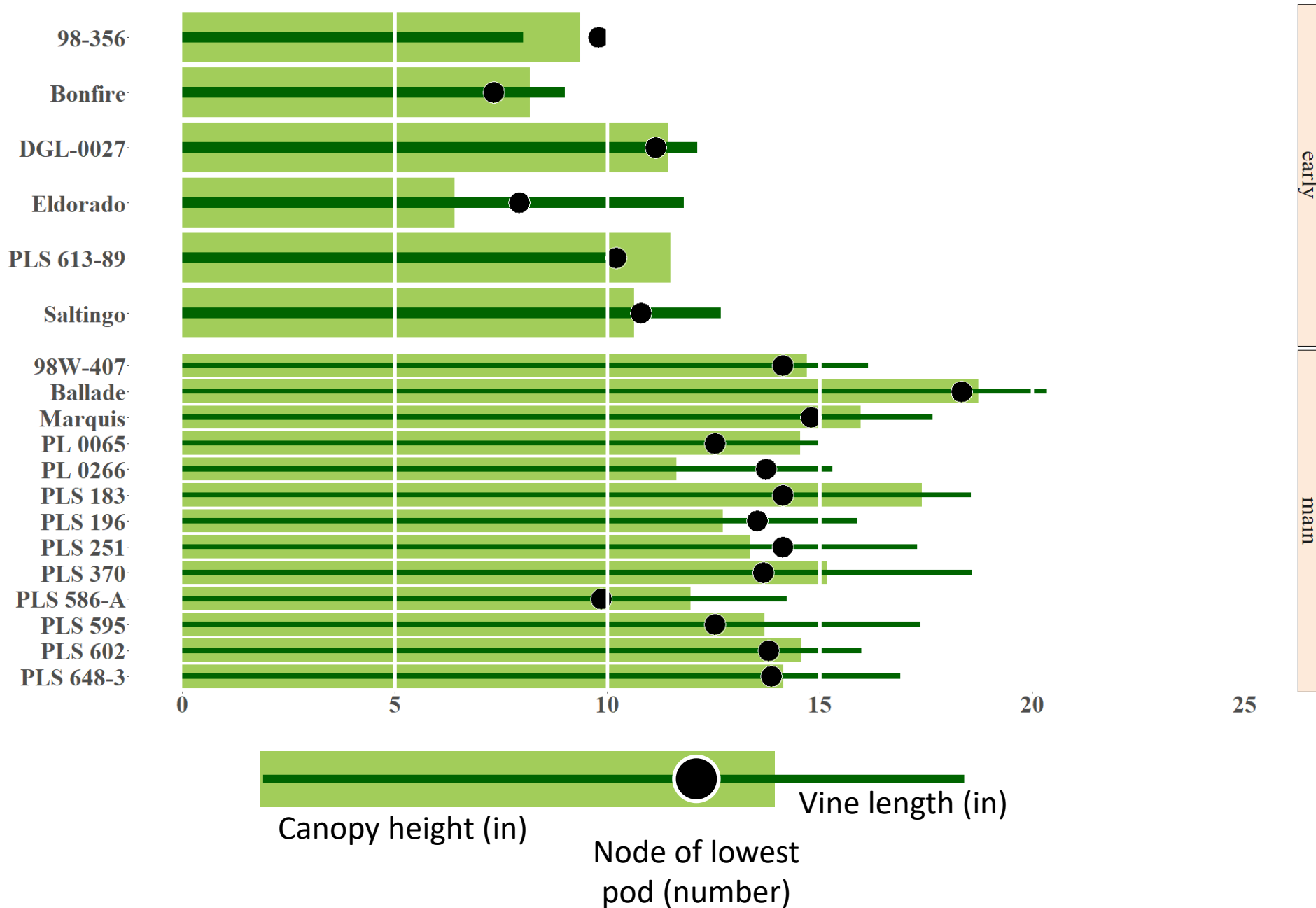
PLS 648-3



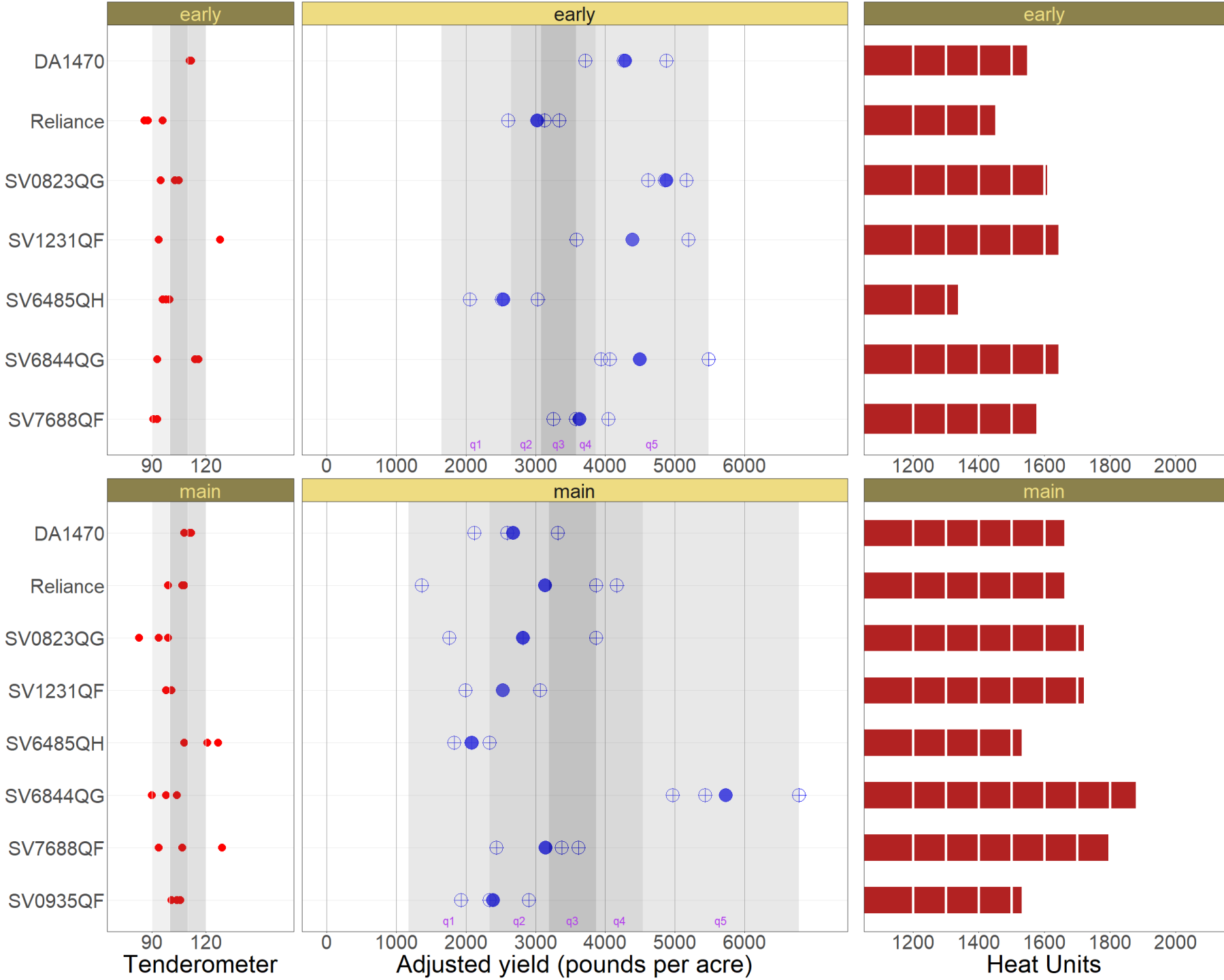
% of initial sieve sample

Sieve Index: 2 3 4 5

PURELINE



SEMINIS

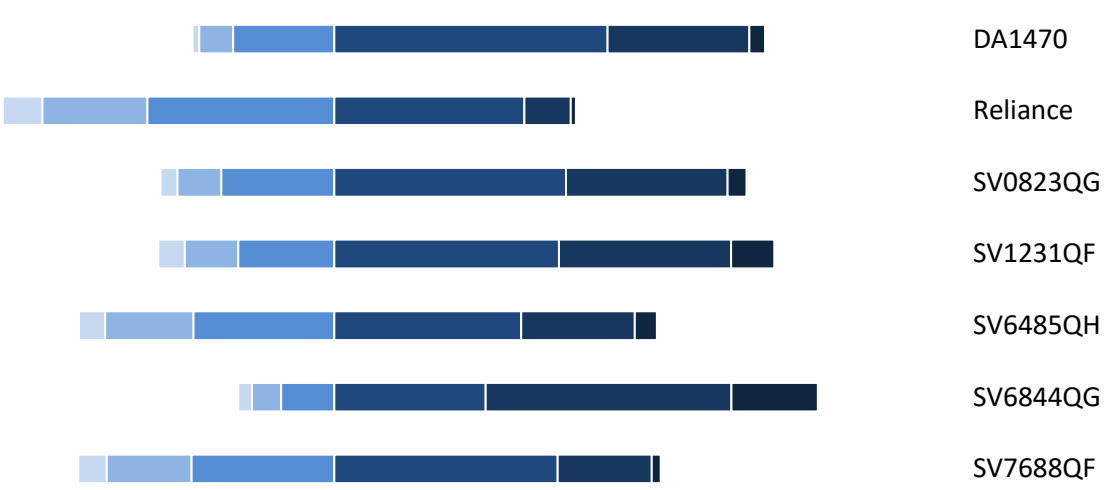


SEMINIS

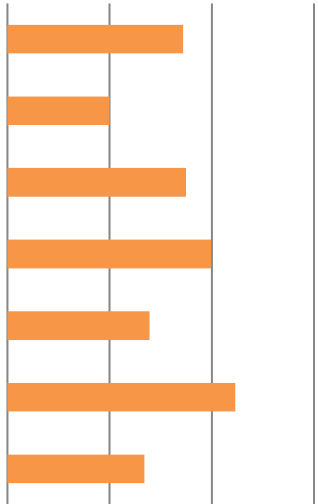
Sieve Size



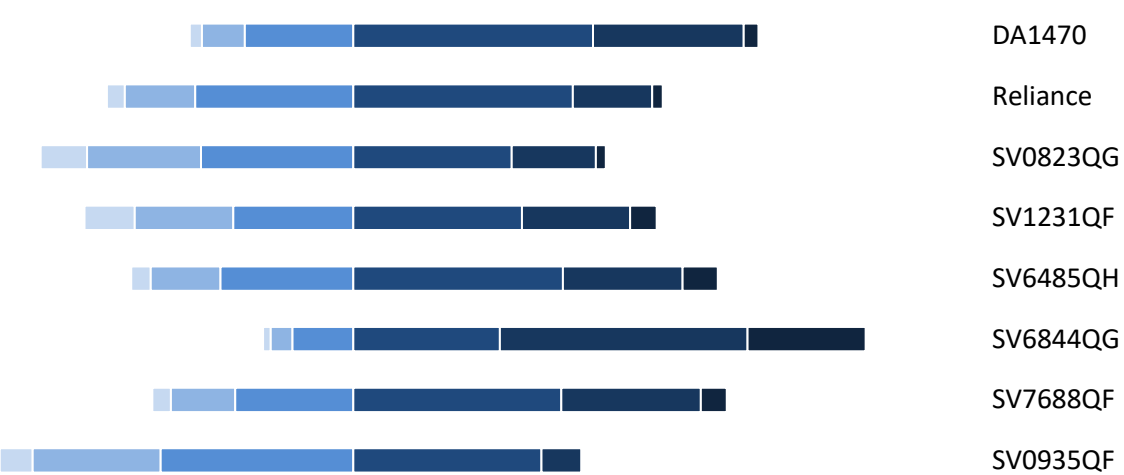
early



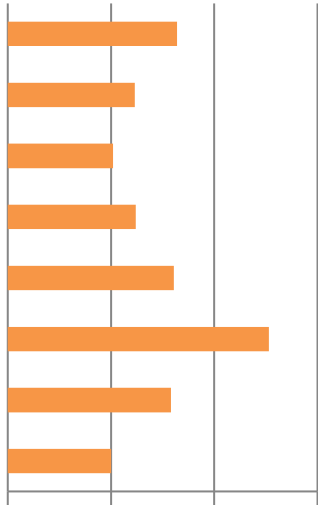
DA1470
Reliance
SV0823QG
SV1231QF
SV6485QH
SV6844QG
SV7688QF



main



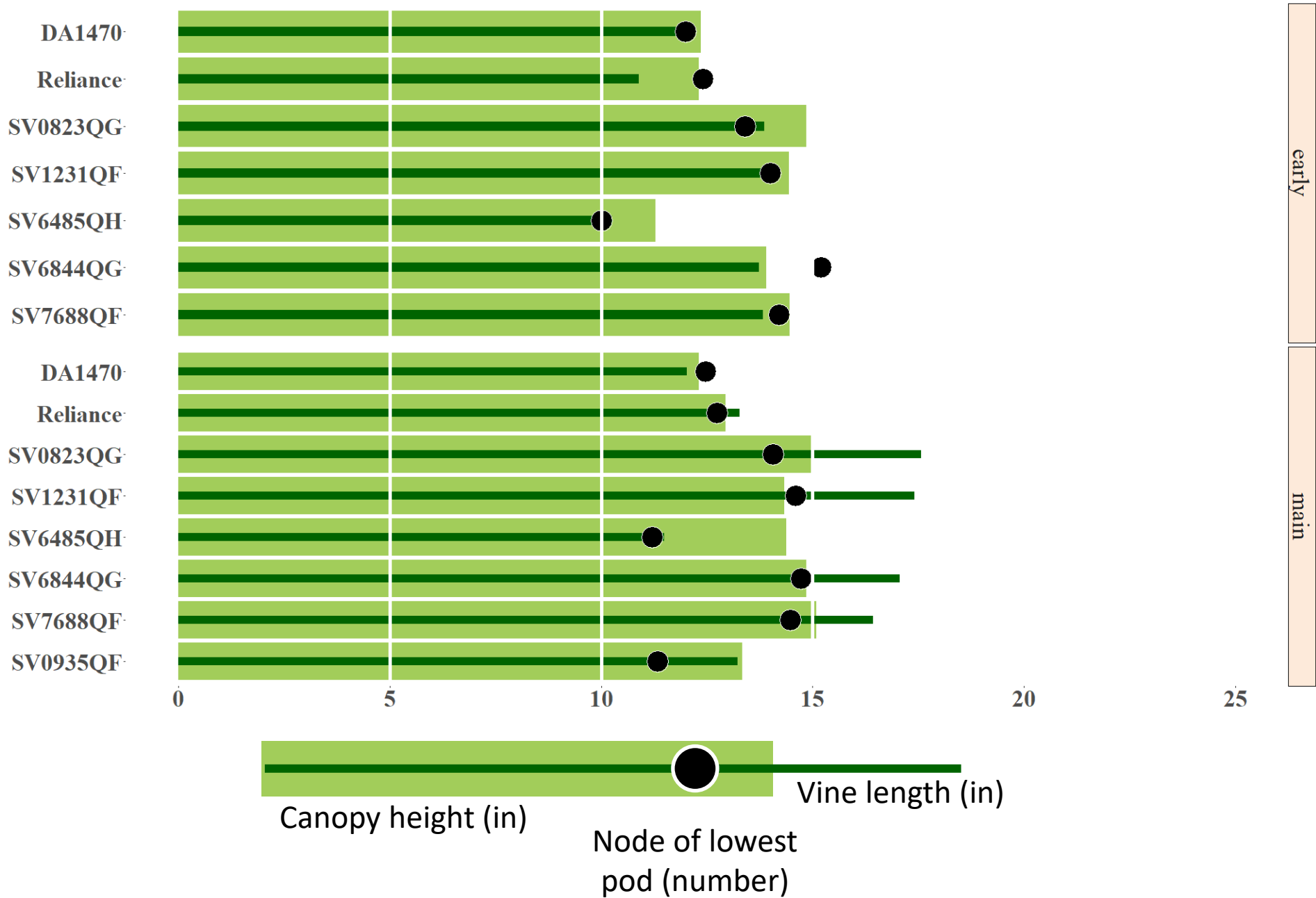
DA1470
Reliance
SV0823QG
SV1231QF
SV6485QH
SV6844QG
SV7688QF
SV0935QF



% of initial sieve sample

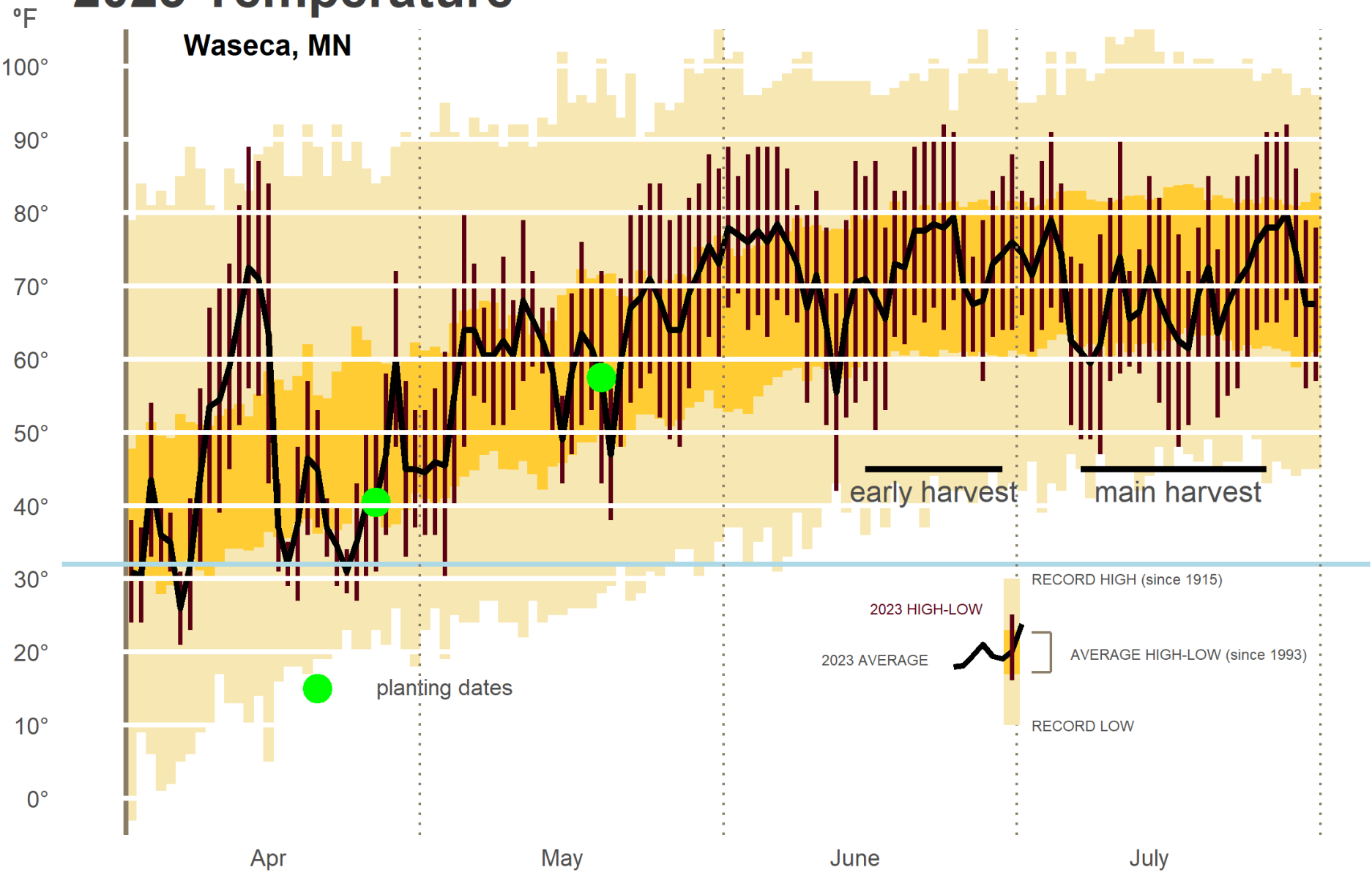
Sieve Index: 2 3 4 5

SEMINIS



2023 Temperature

Waseca, MN



planting dates

early harvest

main harvest

RECORD HIGH (since 1915)

2023 HIGH-LOW

2023 AVERAGE

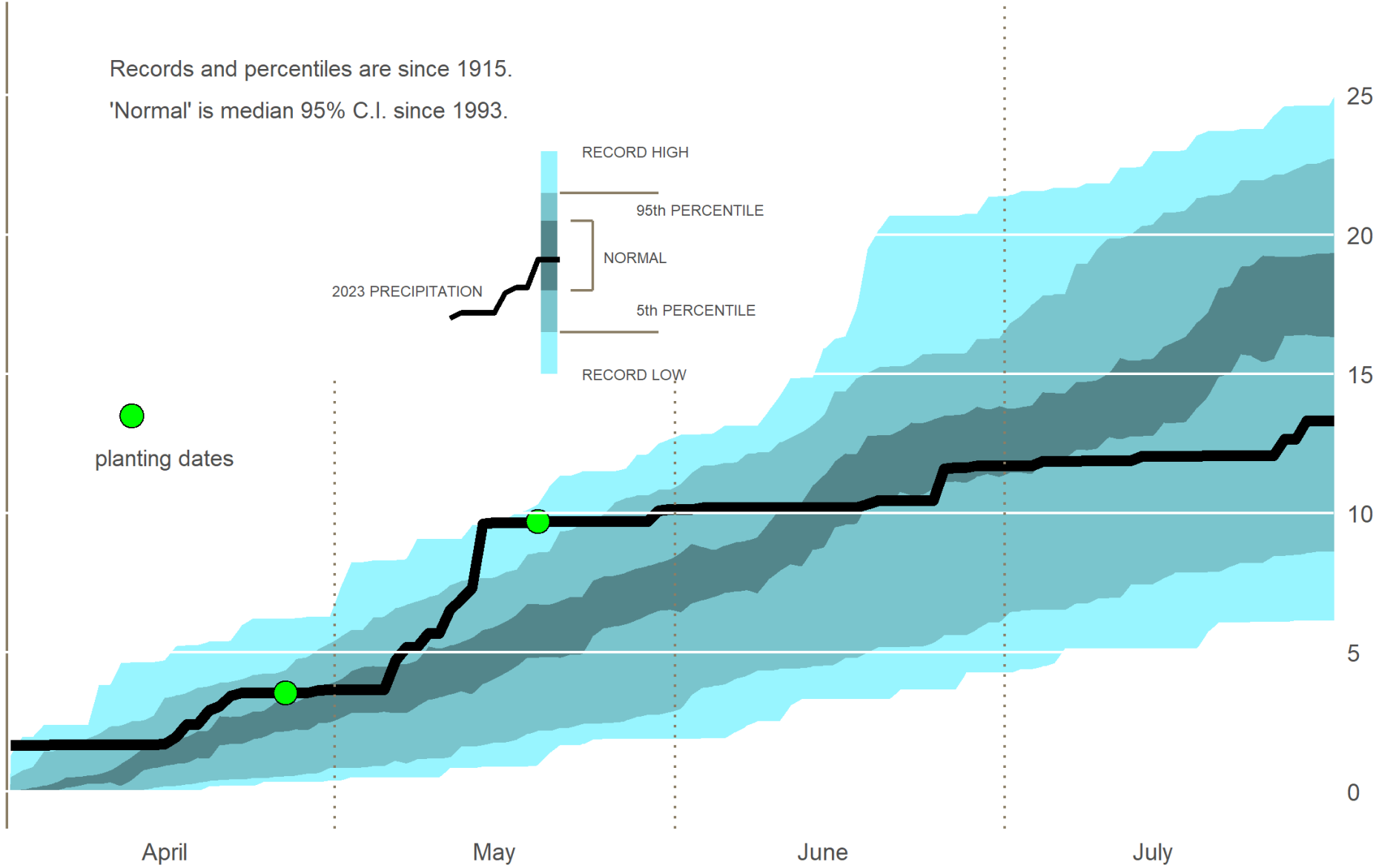
AVERAGE HIGH-LOW (since 1993)

RECORD LOW

2023 Cumulative Precipitation (inches)

Records and percentiles are since 1915.

'Normal' is median 95% C.I. since 1993.



UNIVERSITY OF MINNESOTA
SOUTHERN RESEARCH AND OUTREACH CENTER
35838 120th Street
Waseca, MN 56093-4521
APRIL 2023

Date	Air Temp.		HDD	Cumul* HDD	Precip	Cumul** Precip.	Snow	Snow Depth	Evap	Soil Temperatures						Wind	Solar Radiation		
	Max.	Min.								2"		4"		8"				20"	40"
	Max.	Min.								Max	Min	Max	Min.	Max.	Min.	Avg.	Avg.	mi.	Langleys
	----- o F -----									----- o F -----									
1	38	24	34.0	6611.0	1.65	8.94	3	3		38	32	32	32	33	32	34	37	361	82
2	37	24	34.5	6645.5	-		-	2		32	32	32	32	33	33	34	37	214	599
3	54	33	21.5	6667.0	-		-	T		32	32	32	32	33	32	34	37	235	486
4	40	32	29.0	6696.0	-		-	0		32	32	32	32	34	33	34	37	167	263
5	39	31	30.0	6726.0	0.03	8.97	-	-		36	32	35	32	35	33	34	37	298	80
6	31	21	39.0	6765.0	-		-	-		37	31	36	33	35	34	35	37	425	231
7	41	23	33.0	6798.0	-		-	-		43	31	38	32	35	33	35	37	222	602
8	56	32	21.0	6819.0	-		-	-		52	33	44	33	39	34	36	35	220	566
9	67	40	11.5	6830.5	-		-	-		54	36	48	37	42	37	38	36	277	516
10	70	39	10.5	6841.0	-		-	-		59	41	53	42	46	41	40	38	229	450
11	73	48	4.5	6845.5	-		-	-		70	44	60	45	51	44	41	38	128	594
12	81	51	0.0	6845.5	-		-	-	0.58	68	48	61	49	53	48	44	39	361	573
13	89	56	0.0	6845.5	-		-	-		73	54	65	54	56	51	46	40	375	606
14	87	55	0.0	6845.5	-		-	-	1.04	73	56	66	56	58	54	49	41	385	626
15	84	43	1.5	6847.0	0.03	9.00	-			74	53	66	56	59	55	50	42	271	570
16	43	31	28.0	6875.0	0.24	9.24	0.5	T		53	40	56	44	56	47	51	43	222	72
17	35	29	33.0	6908.0	0.45	9.69	1.5	1	0.06	40	36	44	39	48	42	48	44	333	142
18	48	27	27.5	6935.5	-		-	0		51	36	46	39	45	42	45	44	176	654
19	57	36	18.5	6954.0	0.50	10.19	-		0.34	56	36	50	39	46	42	44	44	266	599
20	53	37	20.0	6974.0	0.17	10.36	-		0.09	50	41	48	42	46	44	44	44	324	277
21	41	33	28.0	7002.0	0.35	10.71	-			43	36	43	39	44	41	44	44	275	87
22	40	29	30.5	7032.5	0.12	10.83	0.2	T		44	35	43	38	42	40	43	44	280	322
23	34	28	34.0	7066.5	T		T	0		39	34	39	36	40	39	42	43	179	197
24	43	27	30.0	7096.5	-		-		0.09	50	34	45	36	42	38	41	43	102	475
25	50	30	25.0	7121.5	-		-			55	35	49	38	44	39	42	43	158	576
26	50	31	24.5	7146.0	-		-			57	36	51	39	45	41	42	43	187	685
27	58	36	18.0	7164.0	-		-			59	37	53	40	47	42	43	43	261	532
28	72	48	5.0	7169.0	-		-			59	46	55	47	50	46	45	43	230	371
29	57	33	20.0	7189.0	0.10	10.93	-		0.92	53	41	51	44	49	46	46	43	143	188
30	53	37	20.00	7209.00	0.02	10.95	-		0.16	54	41	51	43	48	45	46	44	293	468
Total	54.0	34.8	632.0	7209.0	3.66	10.95	5.2		3.28	51.2	38.4	47.5	40.0	44.5	40.9			7597	12489
Avg.	44.4									44.8		43.7		42.7		41.7	40.7		
Dept. from Normal	-0.7		30.5	247.0	0.36	2.93	2.2			-2.5		-1.4		-0.9		-0.4			1254

* Since Nov. 1, 2022

** Since Jan. 1, 2023

New record high(13th) and low(23rd) maximum temperature.

UNIVERSITY OF MINNESOTA
SOUTHERN RESEARCH AND OUTREACH CENTER
35838 120TH STREET
WASECA, MINNESOTA 56093-4521
May 2023

Date	Air Temp.		GDU	Cumul.* GDU	Precip.	Cumul.** Precip.	Evap.	Soil Temperatures						Wind	Solar Radiation		
	Max.	Min.						2"		4"		8"				20"	40"
	Max.	Min.						Max.	Min.	Max.	Min.	Max.	Min.	Avg.	Avg.		
	---- o F----				----- in. -----			----- o F-----						mi.	Langleys		
1	53	36	1.5	1.5	-	10.95	0.16	50	40	48	43	46	45	45	44	293	330
2	56	36	3.0	4.5	-			60	40	54	42	48	44	45	44	328	710
3	61	30	5.5	10.0	-			62	42	57	45	50	46	46	44	219	724
4	70	40	10.0	20.0	-			71	42	63	45	53	46	47	44	101	701
5	80	48	15.0	35.0	T		1.07	75	49	67	51	57	50	49	45	173	681
6	73	55	14.0	49.0	1.04	11.99		66	55	62	56	56	54	51	45	166	272
7	67	54	10.5	59.5	0.47	12.46		62	56	59	56	56	55	52	46	157	187
8	70	51	10.5	70.0	T		0.27	65	54	62	55	57	55	52	47	88	292
9	74	51	12.5	82.5	0.51	12.97		73	54	66	55	59	55	53	47	157	498
10	68	53	10.5	93.0	-			66	54	62	55	58	56	54	48	149	363
11	79	57	18.0	111.0	0.84	13.81	0.70	72	54	66	56	60	56	54	48	210	638
12	72	59	15.5	126.5	0.38	14.19	0.16	70	59	65	59	61	58	55	49	147	328
13	67	58	12.5	139.0	0.41	14.60		65	57	63	58	60	58	56	49	264	140
14	67	50	8.5	147.5	2.30	16.90		63	55	60	56	58	57	56	50	329	144
15	55	43	2.5	150.0	0.05	16.95	0.48	57	48	57	51	57	53	55	50	210	190
16	69	47	9.5	159.5	-			72	48	65	51	58	53	54	51	84	649
17	76	51	13.5	173.0	-		0.38	69	52	65	54	60	55	55	51	149	580
18	70	53	11.5	184.5	-			68	53	65	56	60	57	56	51	284	554
19	72	43	11.0	195.5	0.03	16.98		69	50	64	54	60	57	56	51	173	360
20	56	38	3.0	198.5	-			61	47	60	51	57	54	56	51	103	388
21	71	48	10.5	209.0	-			79	48	70	51	61	54	55	52	82	752
22	80	54	17.0	226.0	-		1.01	82	55	74	57	64	57	57	52	105	727
23	81	56	18.5	244.5	-			81	60	74	62	66	61	59	52	151	652
24	84	58	21.0	265.5	-			83	61	76	63	67	62	60	52	134	688
25	84	52	18.0	283.5	-			84	61	77	64	69	64	61	53	238	607
26	79	49	14.5	298.0	-			81	59	74	62	67	63	62	54	226	600
27	80	48	15.0	313.0	-			84	59	76	62	68	63	62	54	173	775
28	82	56	19.0	332.0	-			84	60	77	63	68	63	62	55	190	770
29	84	60	22.0	354.0	-			85	62	77	64	69	64	63	55	187	684
30	88	63	24.5	378.5	0.39	17.37	2.93	85	65	78	67	70	66	63	55	209	583
31	86	60	23.0	401.5	0.05	17.42	0.20	76	63	72	65	68	66	64	56	179	358
Total	72.7	50.2	401.5	401.5	6.47	17.42	7.4	71.6	53.6	66.3	55.8	60.3	56.4			5658	15925
Avg.	61.5							62.6		61.0		58.3		55.3	49.8		
Dept. from Normal	3.6		81.0	81.0	2.00	4.93	0.56	1.7		3.5		1.8		0.8			2338

* Since May 1, 2023

** Since Jan. 1, 2023

UNIVERSITY OF MINNESOTA
SOUTHERN RESEARCH AND OUTREACH CENTER
35838 120TH STREET
WASECA, MINNESOTA 56093-4521
June 2023

Date	Air Temp.		GDU	Cumul.* GDU	Precip.	Cumul.** Precip.	Evap.	Soil Temperatures						Wind	Solar Radiation		
	Max.	Min.						2"		4"		8"				20"	40"
	----- o F -----				----- in. -----			----- o F -----						mi.	Langleys		
								Max.	Min.	Max.	Min.	Max.	Min.	Avg.	Avg.		
1	89	67	26.5	428.0	-		0.26	86	64	79	65	71	65	64	56	200	594
2	85	69	27.0	455.0	T			87	68	80	70	72	68	65	57	224	538
3	88	64	25.0	480.0	0.06	17.48		88	68	80	69	73	69	66	57	150	393
4	89	66	26.0	506.0	-			91	69	82	69	74	69	66	58	129	590
5	89	63	24.5	530.5	-		1.18	89	70	82	72	75	71	67	58	83	541
6	89	68	27.0	557.5	T			90	71	83	72	76	71	68	59	97	488
7	86	66	26.0	583.5	T		0.45	84	71	79	72	74	72	68	59	102	307
8	81	65	23.0	606.5	-			88	71	81	72	75	71	68	59	158	530
9	80	54	17.0	623.5	-		0.60	89	67	83	70	76	71	69	60	88	621
10	83	60	21.5	645.0	-			87	68	82	70	75	71	69	60	125	619
11	78	51	14.5	659.5	-			80	65	77	68	76	69	69	61	242	337
12	69	42	9.5	669.0	-		0.85	82	61	76	65	71	67	68	61	180	689
13	79	52	15.5	684.5	-			80	62	76	65	71	66	67	61	135	568
14	87	54	20.0	704.5	-			85	64	80	66	73	67	67	61	104	641
15	85	57	21.0	725.5	-		0.94	87	67	81	69	74	69	68	61	91	598
16	87	50	18.0	743.5	-			85	64	79	67	73	69	68	61	187	622
17	78	53	15.5	759.0	-			86	64	79	67	72	68	68	61	109	672
18	83	63	23.0	782.0	0.13	17.61		84	67	78	69	73	69	68	61	147	508
19	83	62	22.5	804.5	0.12	17.73	0.69	77	66	74	67	71	68	68	62	108	319
20	89	66	26.0	830.5	-			89	66	82	67	74	68	68	62	151	735
21	90	65	25.5	856.0	-		0.83	90	70	83	72	75	71	69	62	179	730
22	90	67	26.5	882.5	-			90	70	83	72	76	72	69	62	132	698
23	92	64	25.0	907.5	-		0.74	94	72	86	73	78	73	70	62	96	663
24	91	68	27.0	934.5	-			93	73	86	75	79	74	71	63	127	691
25	80	60	20.0	954.5	1.14	18.87		78	66	77	69	76	70	71	63	193	270
26	74	61	17.5	972.0	0.06	18.93	0.77	75	66	74	68	71	69	70	63	175	407
27	79	57	18.0	990.0	-			76	64	74	66	70	68	68	63	124	505
28	83	63	23.0	1013.0	0.05	18.98	0.51	87	64	81	66	74	67	68	63	123	662
29	85	64	24.5	1037.5	-			82	68	79	71	74	70	69	63	180	565
30	88	64	25.0	1062.5	-		0.43	91	70	84	72	77	72	70	63	80	658
Total	84.3	60.8	661.0	1062.5	1.56	18.98	8.3	85.7	67.2	80.0	69.2	74.0	69.5			4219	16759
Avg.		72.6						76.4		74.6		71.7		68.1	60.7		
Dept. from Normal																	
		4.2		113.0	194.00	-3.82	1.11	0.3	3.6	4.6	3.9	3.1					1747

* Since May 1, 2023

** Since Jan. 1, 2023

New record high(2nd) and low(12th) minimum temperature.

Tied for 5th driest June on record with June of 1933. Ranked 4th for monthly accumulated GDU's.

UNIVERSITY OF MINNESOTA
SOUTHERN RESEARCH AND OUTREACH CENTER
35838 120TH STREET
WASECA, MINNESOTA 56093-4521
July 2023

Date	Air Temp.		GDU	Cumul.* GDU	Precip.	Cumul.** Precip.	Evap.	Soil Temperatures						Wind	Solar Radiation		
	Max.	Min.						2"		4"		8"				20"	40"
	Max.	Min.						Max.	Min.	Max.	Min.	Max.	Min.	Avg.	Avg.		
	---- o F----				----- in. -----			----- o F-----						mi.	Langleys		
1	83	66	24.5	1087.0	T	18.98	0.24	84	72	81	74	77	73	71	63	74	491
2	82	61	21.5	1108.5	-			84	70	81	72	77	73	71	64	72	472
3	87	64	25.0	1133.5	T		0.52	89	71	84	72	78	73	71	64	66	616
4	91	67	26.5	1160.0	0.16	19.14		91	71	84	73	78	74	72	64	132	517
5	84	65	24.5	1184.5	T		0.48	84	71	81	73	76	74	71	64	117	399
6	74	51	12.5	1197.0	-			86	66	82	70	77	72	71	65	123	613
7	73	49	11.5	1208.5	-		0.55	85	65	80	69	75	71	71	65	76	637
8	70	49	10.0	1218.5	0.02	19.16		75	62	74	65	72	68	70	65	84	296
9	77	47	13.5	1232.0	-			84	63	79	65	73	68	69	65	86	626
10	82	57	19.5	1251.5	-		0.71	87	64	81	68	74	69	69	65	193	702
11	90	58	22.0	1273.5	0.01	19.17		91	69	85	71	77	71	70	65	186	696
12	72	59	15.5	1289.0	-			84	69	80	71	75	72	71	65	106	487
13	75	58	16.5	1305.5	0.16	19.33		79	67	76	69	73	71	70	65	75	354
14	85	60	22.5	1328.0	-		0.92	89	67	82	69	75	70	70	65	121	573
15	82	54	18.0	1346.0	T			83	66	79	70	75	71	70	65	104	448
16	80	50	15.0	1361.0	-			86	66	80	69	75	71	70	65	104	574
17	77	48	13.5	1374.5	-		0.71	82	64	79	68	74	70	70	65	142	563
18	72	51	11.5	1386.0	-			80	64	77	68	73	69	70	65	87	550
19	78	60	19.0	1405.0	0.02	19.35		89	65	82	68	75	69	70	65	72	677
20	85	60	22.5	1427.5	-			88	70	82	72	75	71	70	65	163	612
21	75	52	13.5	1441.0	-		1.01	83	67	80	70	75	72	71	65	109	562
22	80	55	17.5	1458.5	-			86	67	82	70	76	71	71	65	71	575
23	85	56	20.5	1479.0	-			90	69	84	71	77	72	71	66	91	629
24	85	60	22.5	1501.5	-		0.67	91	70	85	73	78	73	72	66	42	596
25	88	64	25.0	1526.5	-			94	72	86	74	79	74	72	66	72	614
26	91	65	25.5	1552.0	0.58	19.93	0.66	94	74	87	76	80	75	73	66	139	597
27	91	65	25.5	1577.5	-			95	74	88	76	80	76	74	66	86	646
28	92	68	27.0	1604.5	0.67	20.60	0.65	94	74	8	77	82	77	75	67	161	572
29	86	63	24.5	1629.0				87	69	85	73	80	75	75	67	101	529
30	79	56	17.5	1646.5				87	68	84	72	78	74	74	67	86	618
31	78	57	17.5	1664.0			0.71	88	68	84	72	78	73	74	68	72	520
Total	81.6	57.9	601.5	1664.0	1.62	20.60	7.8	86.7	68.2	79.4	71.0	76.4	72.0			3213	17361
Avg.	69.7							77.5		75.2		74.2		71.3	65.3		
Dept. from Normal																	
	-1.7		-50.0	144.00	-3.31	-2.20	0.23	-1.7		-1.1		0		-0.5			911

* Since May 1, 2023

** Since Jan. 1, 2023