

2021 University of Minnesota Processing Pea Variety Trial

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Average yield (#/Ac)		
	Early	Main
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 2021 trial were very poor. Precipitation in April, May, and June was near-record low (5.28 inches total). The low temperature was at least 70°F for 4 days in early June, with 11 daily high temperatures in June at least 90°F. Just 0.38 inches of precipitation were recorded from June 1 through June 26. Disease pressure was generally low.

Design

Peas were planted in plots 10- by 50-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 25 entries in our early-planted trial (16 April) and 31 entries in our main-season trial (planted 6 May). Harvest was targeted when a bulked sample of 1 m² from each triplicate plot per entry was at a tenderometer reading of 90–100. 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 (90-100) 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		Adjusted Yield		Sieve Size		Harvest Date	Canopy		
			(lbs/acre)	(lbs/acre)	Tenderometer	Index	Heat Units	Height (inch)		Vine Length (inch)	Lowest pod node	
Brotherton	EXP125	509,897	2,093	2,345	91	2.91	1296	18-Jun	12.8	13.8	10.8*	
Brotherton	EXP455	322,395	1,421	1,309*	104	2.74*	1161	14-Jun	13.9	13.6	8.4*	
Brotherton	EXP461	427,227	993	1,198*	93	2.35*	1192	15-Jun	13.9	12.9*	8.9*	
Crites	CS-455AF	412,774	1,411	1,542	95	3.02	1192	15-Jun	13.6	12.8*	7.9*	
Gallatin Valley	Austin	646,139	2,561	2,076	117	3.37*	1161	14-Jun	13.4	14.6	9.7	
Gallatin Valley	FP2269	558,458	1,829	859*	135	4.02*	1161	14-Jun	14.7	14.6	7.8*	
Gallatin Valley	GVS 1648	329,140	2,014	1,519	118	3.03	1161	14-Jun	14.8	14.9	8.3*	
Gallatin Valley	GVS 1703	338,582	2,147	2,147	100	2.78*	1161	14-Jun	13.3	14.6	8.7*	
Gallatin Valley	GVS 1751	384,446	2,172	1,883	110	3.16	1161	14-Jun	13.4	15.3	8.8*	
Gallatin Valley	GVS 435	534,178	1,881	1,676	107	3.39*	1192	15-Jun	15.2*	14.6	8.9*	
Pure Line	11P27	401,982	2,470	2,619	95	3.39*	1224	16-Jun	11.9*	14.2	8.4*	
Pure Line	11P42	385,795	1,822	1,859	99	3.25	1224	16-Jun	12.2*	13.9	8.5*	
Pure Line	DGL0027	474,825	1,427	1,614	93	2.83*	1262	17-Jun	14.1	15.0	9.7	
Pure Line	PLS534	400,633	2,361	2,081	110	3.20	1161	14-Jun	12.7	13.9	7.6*	
Pure Line	Saltingo	538,224	2,055	2,055	100	3.28	1262	17-Jun	14.4	16.0*	9.8	
Pure Line	SP-45	430,310	1,465	1,409*	102	2.84	1161	14-Jun	11.4*	15.2	7.7	
Seminis	SV0371QF	488,314	2,386	1,873	118	2.61*	1389	21-Jun	15.8*	16.3*	11.4*	
Seminis	SV0823QG	489,663	3,554	3,563*	100	3.51*	1432	23-Jun	14.9	16.4*	13.6*	
Seminis	SV0935QF	447,846	2,367	2,143	108	3.34	1389	21-Jun	12.9	13.6	10.3	
Seminis	SV1231QF	458,637	2,824	3,104*	90	2.86	1405	22-Jun	15.0*	15.3	12.9*	
Seminis	SV5795QE †	426,263	890	1,058*	94	2.37*	1228	17-Jun	9.3*	11.9*	7.4*	
Seminis	SV6844QG	455,940	3,578	3,895*	89	3.60*	1432	23-Jun	15.6*	16.4*	14.2*	
Seminis	SV7401QH	555,761	2,620	2,872*	91	2.69*	1296	18-Jun	12.9	13.4	10.5*	
Seminis	SV7688QF	462,684	2,834	2,900*	98	3.26	1432	23-Jun	13.6	13.9	12.9*	
Seminis	SV8112QH	461,335	2,931	2,381	120	3.44*	1389	21-Jun	14.0	14.5	9.7	

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	453,658	2,164	2,079	103	3.09			13.6	14.5	9.7
	LSD	151,684	599	603	7.6	0.25			2.5	1.0	0.7
	Upper Quartile	534,178	2,703	2,541	111.5	3.36			14.9	15.2	10.5
	Lower Quartile	368,259	1,677	1,472	93.0	2.83			12.8	13.7	8.2
	% CV	20	17	18	4.5	4.9			5.5	4.2	4.6

*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.

Peas were planted on 4/16/2021 in plots 10 feet wide and 50 feet long in 3 randomized complete blocks, targeting 600,000 seeds per acre.

[†]This variety was planted on 26 April due to a shipping error.

50 #/A nitrogen (urea) and 1.5 oz Optill / Ac (safinopyr + 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 90-100. Canopy height, vine length, and pod node were recorded 5 times per plot at harvest.

Source	Variety	Plants/Acre	Yield	Adjusted Yield	Sieve Size			Harvest	Canopy		
			(lbs/acre)	(lbs/acre)	Tenderometer	Index	Heat Units	Date	Height (inch)	Vine Length (inch)	Lowest pod node
Brotherton	BSC599	488,314	1,578	1,876	89	3.55*	1456	29-Jun	13.0	14.0	14.5*
Brotherton	BSC737	539,573	3,409	2,877	119	3.59*	1697	6-Jul	14.5*	13.5	15.9*
Brotherton	EXP077	439,752	1,602	1,704	96	2.92*	1657	5-Jul	15.6*	14.0	13.3
Brotherton	EXP529	505,850	3,738	3,300*	116	3.76*	1657	5-Jul	13.8	13.0	13.9
Crites	CS-464AF	531,480	943	1,149*	93	2.63*	1486	30-Jun	13.3	13.1	13.1
Crites	CS-494DAF	418,169	1,940	2,146	93	3.12	1552	2-Jul	10.9*	10.3*	10.6*
Crites	CS-498AF	512,595	2,789	2,275	118	2.57*	1657	5-Jul	14.3*	13.3	13.5
Gallatin Valley	GVS 1672	546,318	1,272	1,524	91	2.77	1552	2-Jul	12.3	10.9	13.6
Gallatin Valley	GVS 1697	318,348	3,831	3,645*	107	3.37*	1657	5-Jul	12.5	10.7	13.6
Gallatin Valley	GVS 1846	284,625	3,155	3,081	103	3.01	1726	7-Jul	13.6	13.1	15.0*
Gallatin Valley	GVS 1848	459,986	2,884	2,781	104	3.41	1657	5-Jul	12.7	11.9	14.1
Gallatin Valley	GVS 518	435,706	847	501*	112	4.51*	1422	28-Jun	9.4*	9.2*	10.5*
Gallatin Valley	GVS 522	623,207	3,381	3,111	110	4.33*	1657	5-Jul	13.8	12.2	12.6
Gallatin Valley	GVS 813	462,684	2,442	2,563	96	1.53*	1697	6-Jul	12.9	12.3	15.7*
Gallatin Valley	GVS 828	604,322	1,027	1,353	88	2.67*	1456	29-Jun	12.7	12.6	12.9
Pure Line	07-120	423,565	693	963*	90	3.01	1552	2-Jul	11.0*	10.8	12.3*
Pure Line	14P56	508,548	2,999	2,663	112	3.79*	1697	6-Jul	12.5	11.9	15.1*
Pure Line	94195	480,220	3,286	3,006	110	4.24*	1697	6-Jul	13.2	12.5	12.8
Pure Line	Dancer	403,331	3,383	3,346*	101	3.01	1726	7-Jul	15.0*	13.9	14.7*
Pure Line	PLS576	497,756	1,068	1,526	84	3.20	1552	2-Jul	11.1*	11.5	11.7*
Pure Line	PLS586	364,212	1,857	1,997	95	3.32	1552	2-Jul	11.8	11.3	11.3*
Pure Line	PLS595	488,314	3,199	3,115	103	3.77*	1657	5-Jul	13.6	12.1	13.2
Pure Line	PLS602	319,697	3,239	2,707	119	3.02	1697	6-Jul	13.8	12.9	14.2
Seminis	SV0371QF	571,948	2,147	2,081	102	2.50*	1552	2-Jul	13.1	12.6	12.8
Seminis	SV0823QG	325,093	3,201	3,126	103	3.26	1726	7-Jul	15.1*	14.2	15.1*
Seminis	SV0935QF	368,259	719	934*	92	2.95*	1456	29-Jun	11.7*	11.4	11.1*

Source	Variety	Plants/Acre	Yield	Adjusted Yield	Sieve Size			Harvest	Canopy		
			(lbs/acre)	(lbs/acre)	Tenderometer	Index	Heat Units	Date	Height (inch)	Vine Length (inch)	Lowest pod node
Seminis	SV1231QF	485,616	2,331	2,490	94	3.33	1697	6-Jul	15.1*	15.0*	14.5*
Seminis	SV6844QG	445,148	2,767	3,112	88	3.42	1697	6-Jul	16.2*	15.7*	16.1*
Seminis	SV7401QH	511,246	1,518	1,453	102	3.13	1422	28-Jun	9.0*	8.6*	10.7*
Seminis	SV7688QF	415,472	2,063	2,073	100	3.17	1697	6-Jul	14.9*	13.4	14.3*
Seminis	SV8112QH	511,246	980	1,017*	99	2.96*	1422	28-Jun	9.9*	10.0*	10.3*
Average		460,987	2,267	2,242	101	3.22			13.0	12.3	13.3
LSD		126,187	923	917	10.3	0.24			2.3	1.5	0.9
Upper Quartile		538,224	3,157	2,996	108.0	3.51			14.5	13.4	14.6
Lower Quartile		376,352	1,403	1,497	92.0	2.91			12.0	11.2	12.4
% CV		17	25	25	6.2	4.5			2.3	1.5	0.9

*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.

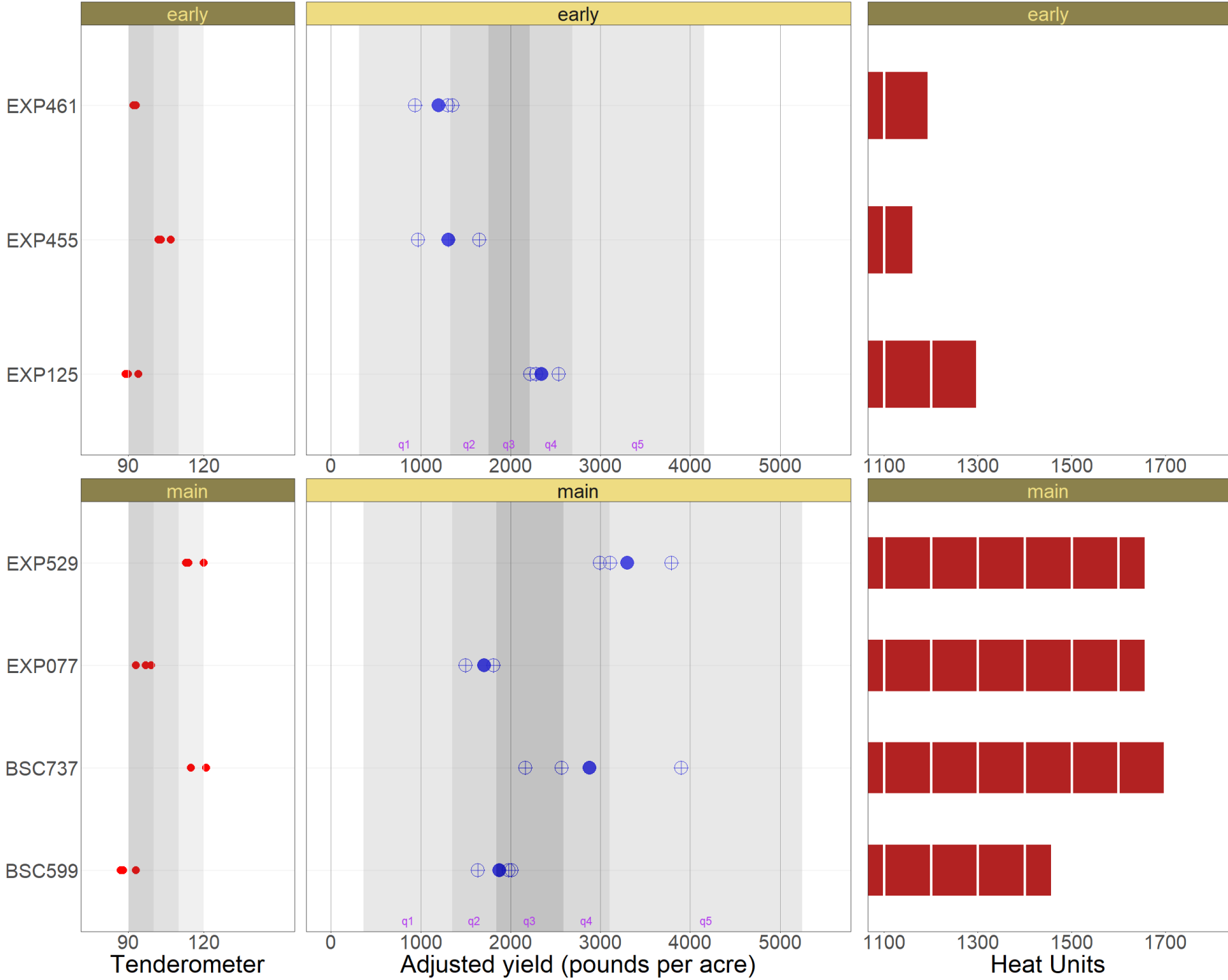
Peas were planted on 5/6/2021 in plots 10 feet wide and 50 feet long in 3 randomized complete blocks, targeting 600,000 seeds per acre.

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BROTHERTON

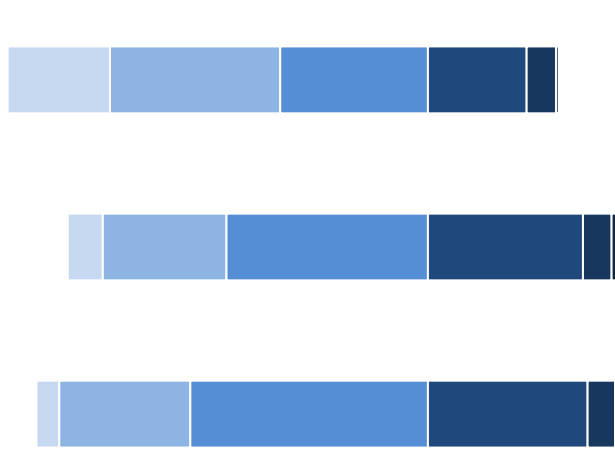


BROTHERTON

Sieve Size



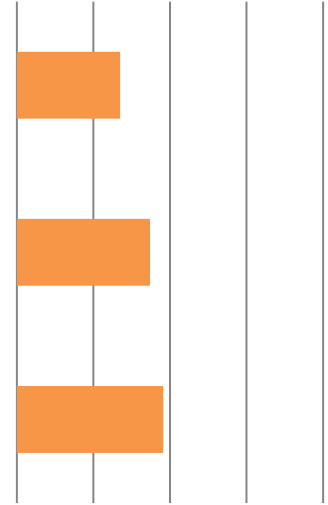
early



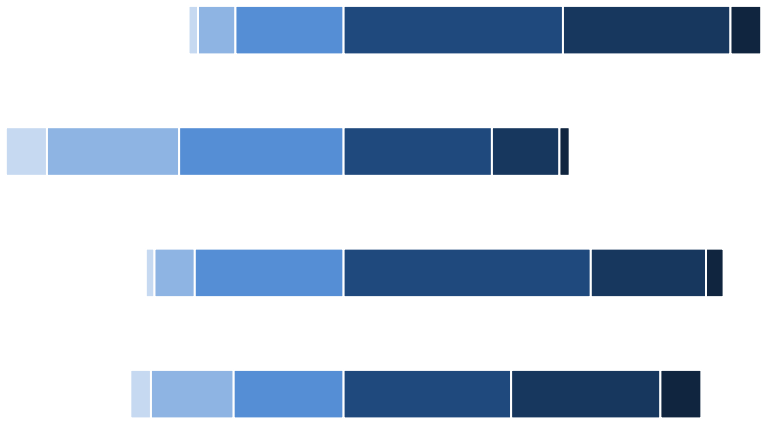
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EXP455

EXP125



main

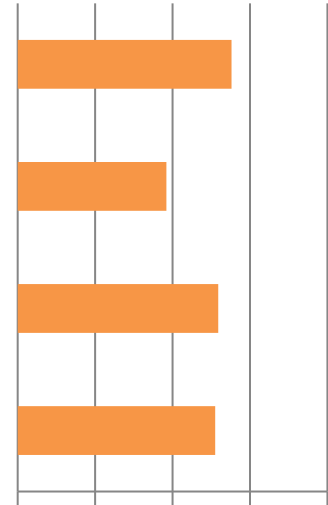


EXP529

EXP077

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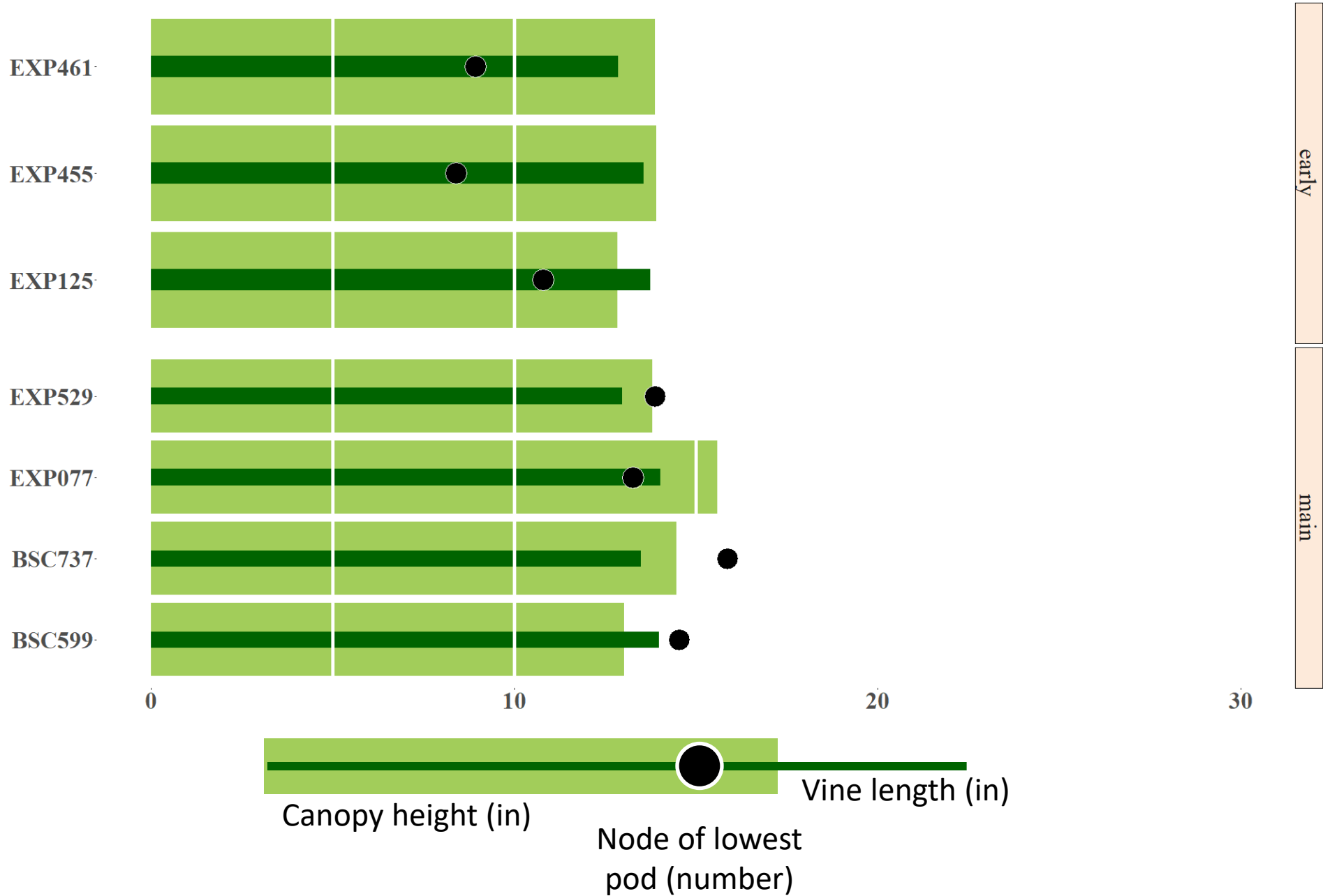
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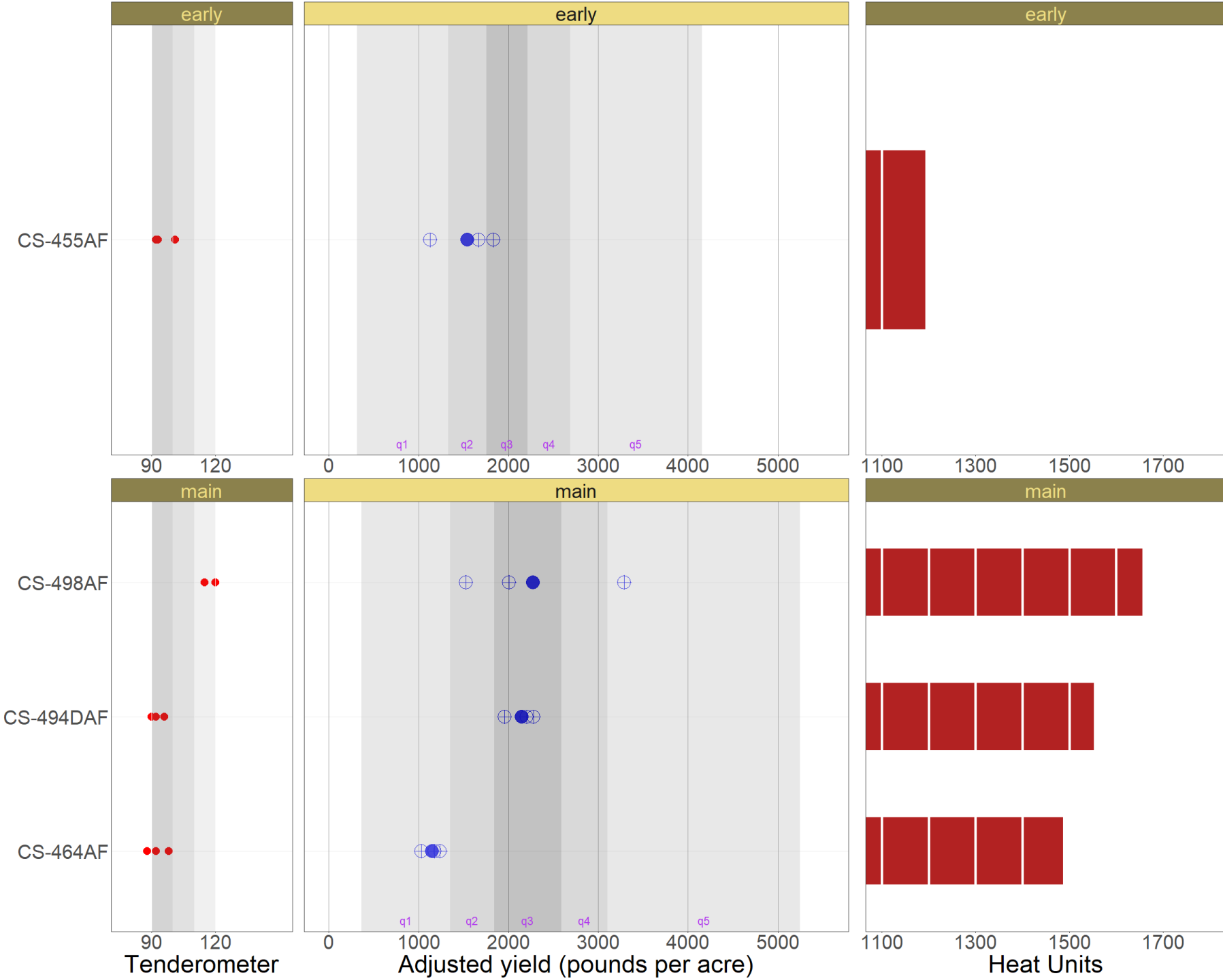
% of initial sieve sample

Sieve Index: 1 2 3 4 5

BROTHERTON



CRITES

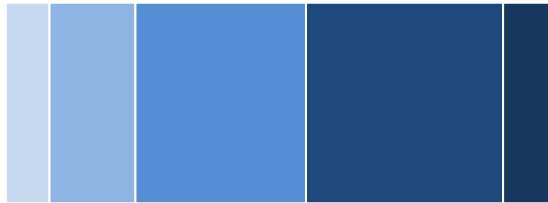


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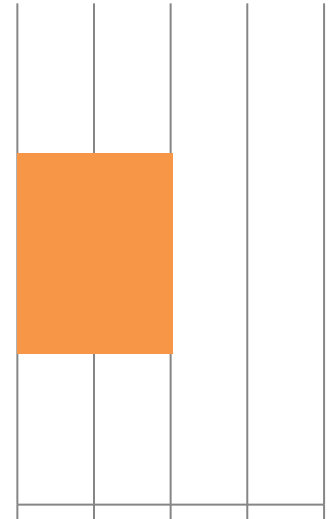
Sieve Size



early



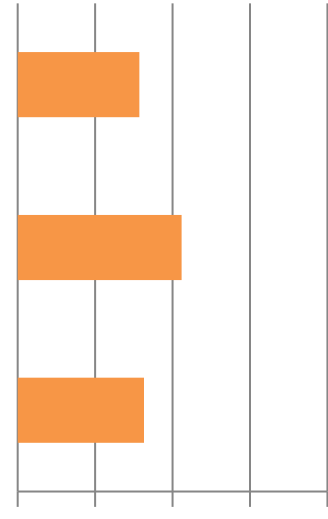
CS-455AF



main



CS-498AF



% of initial sieve sample

CS-494DAF

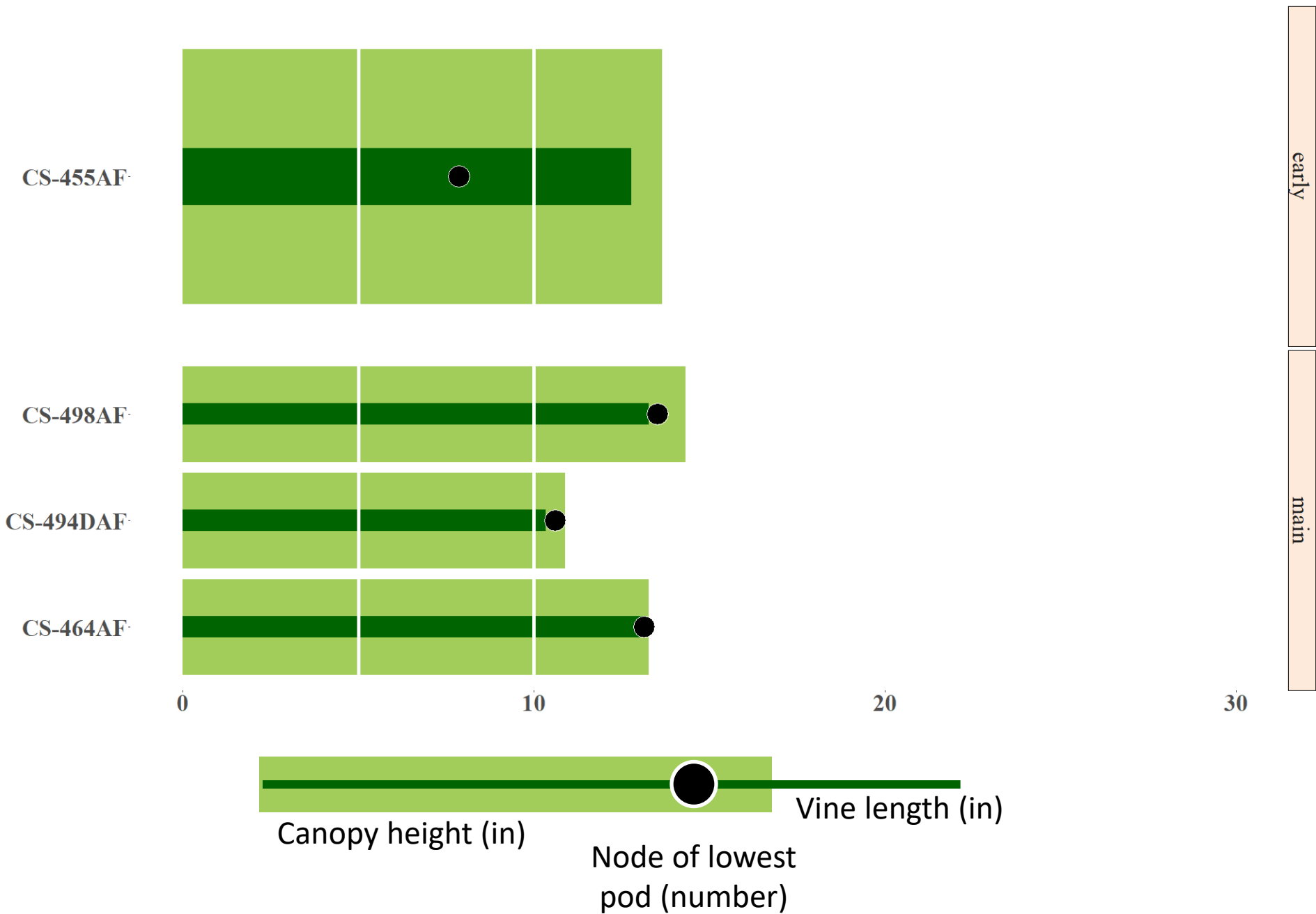


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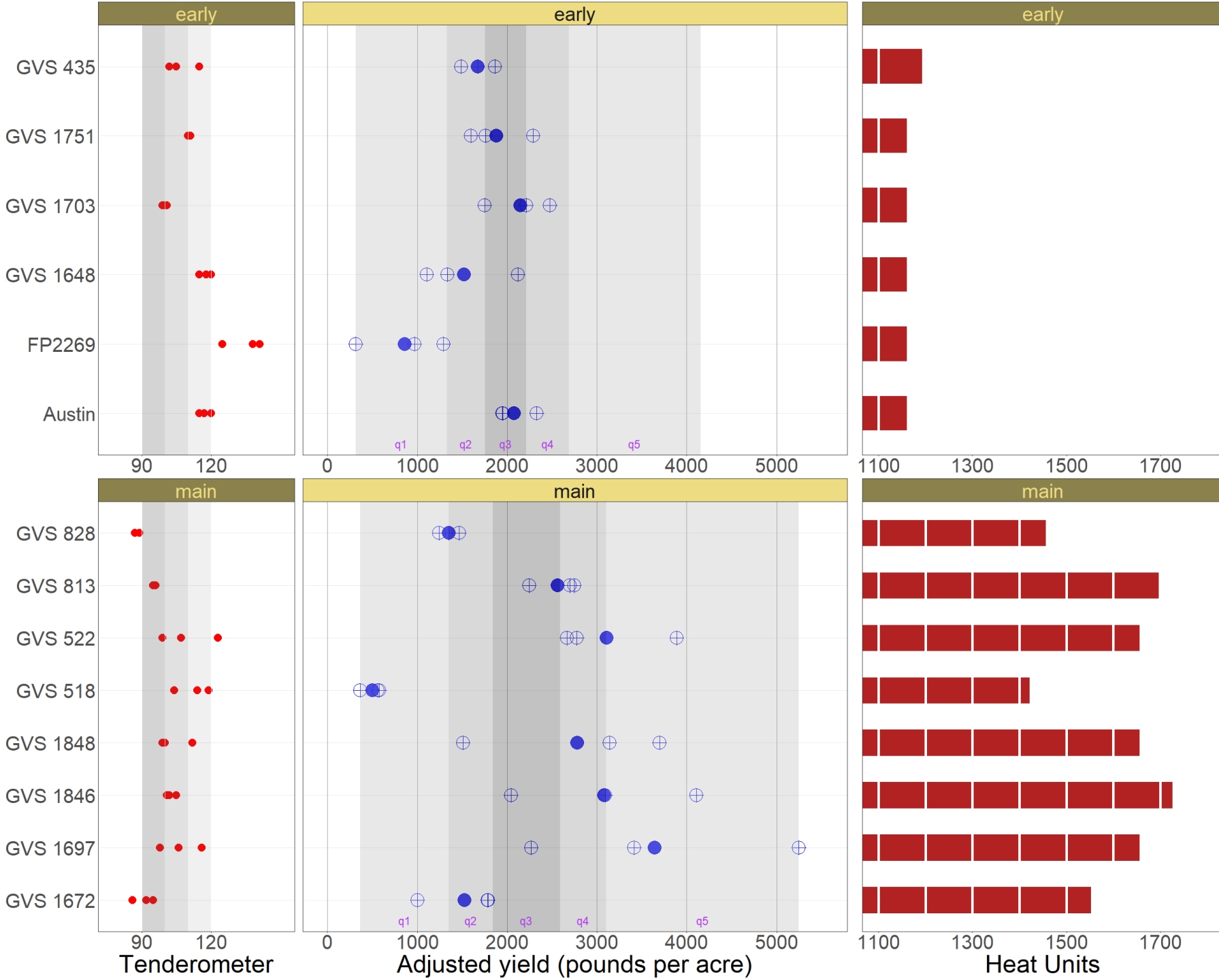


Sieve Index: 1 2 3 4 5

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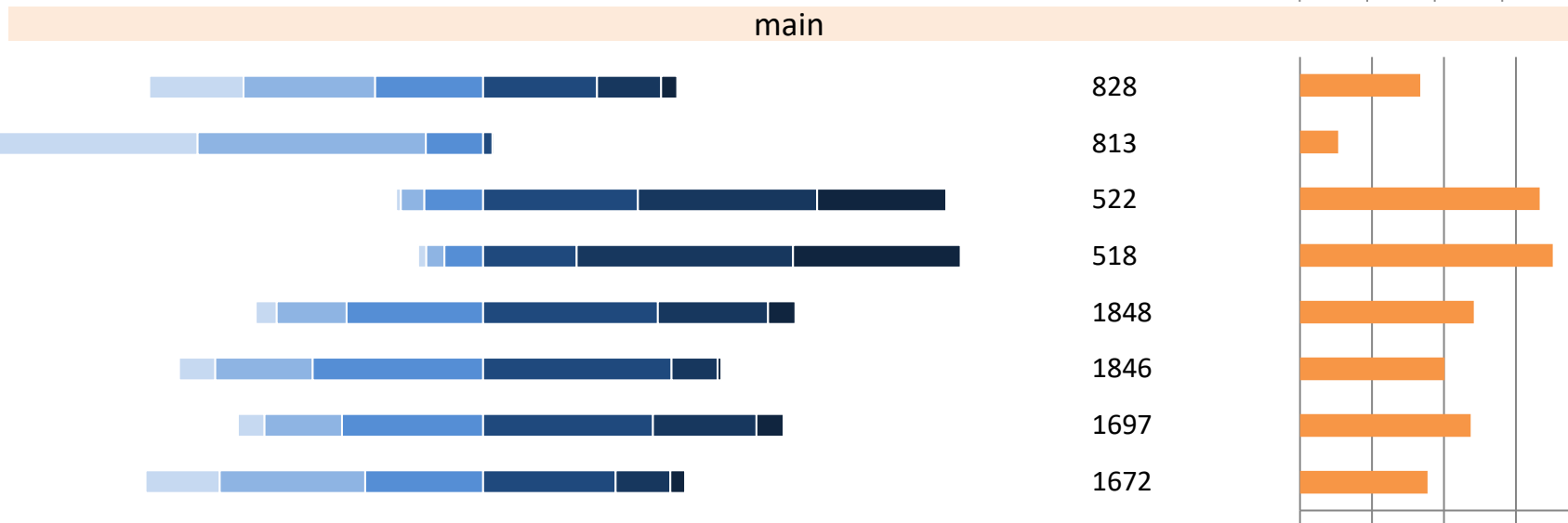
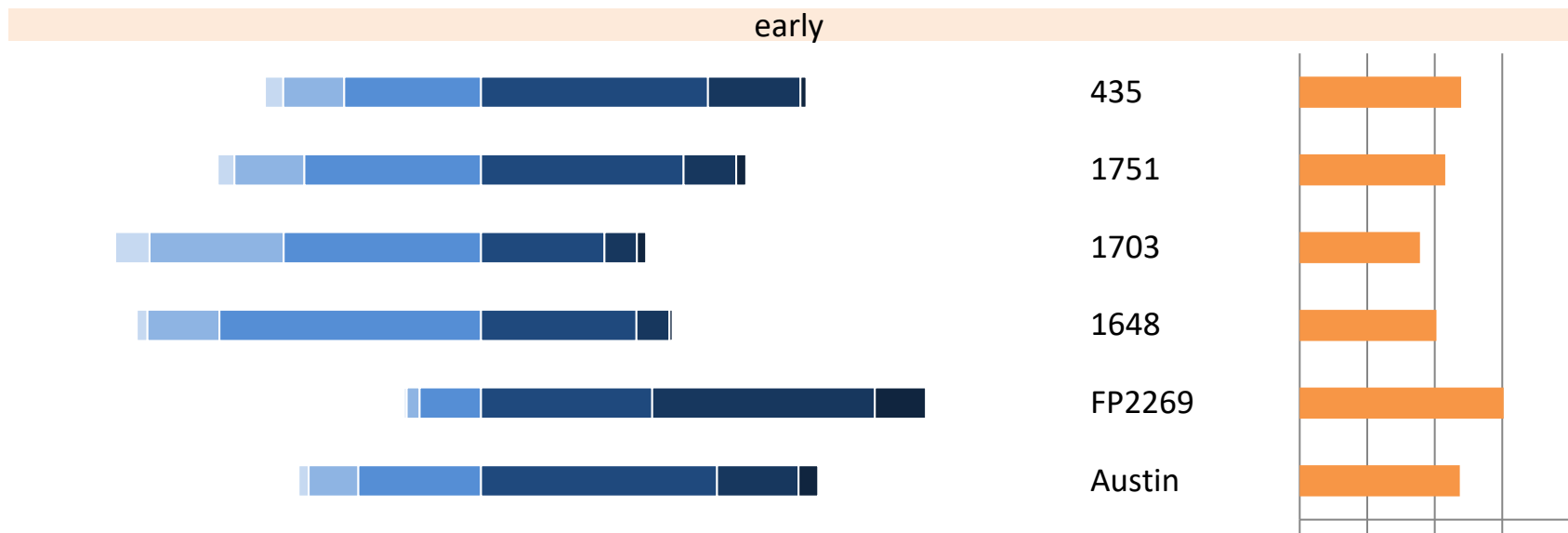


GALLATIN VALLEY



GALLATIN VALLEY

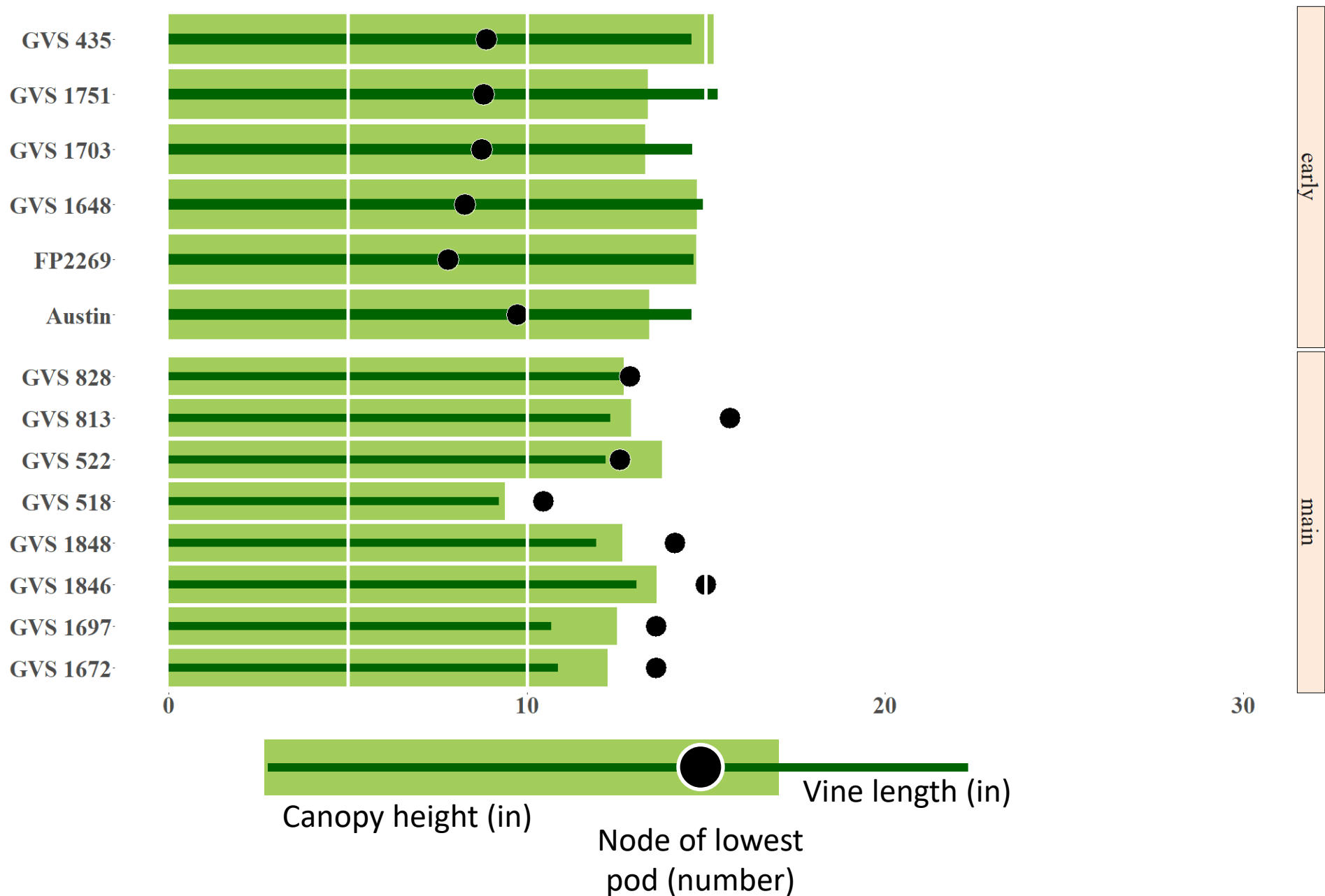
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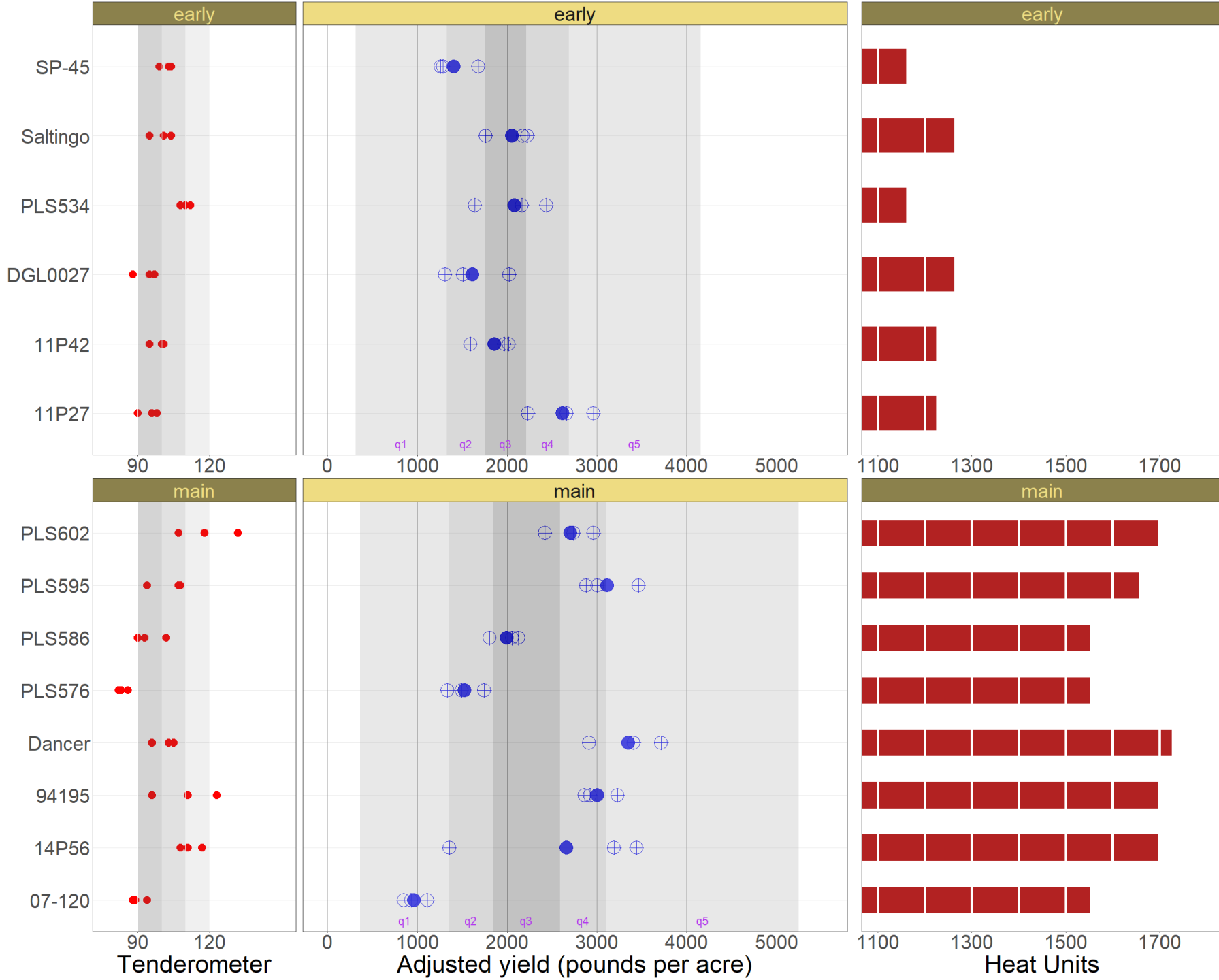
% of initial sieve sample

Sieve Index: 1 2 3 4 5

GALLATIN VALLEY



PURELINE

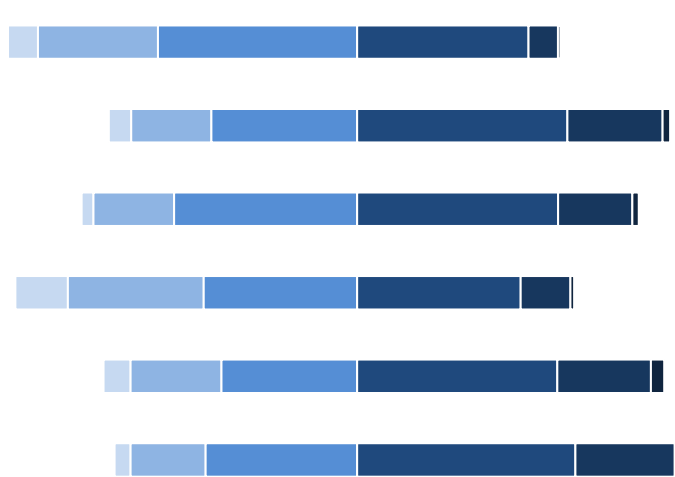


PURELINE

Sieve Size



early



SP-45

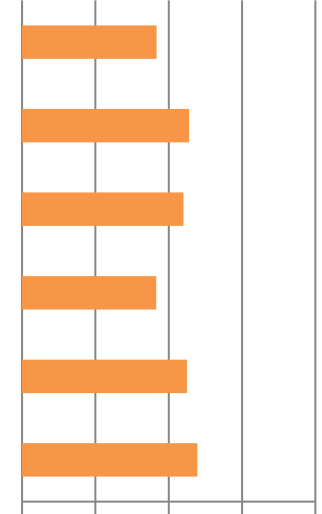
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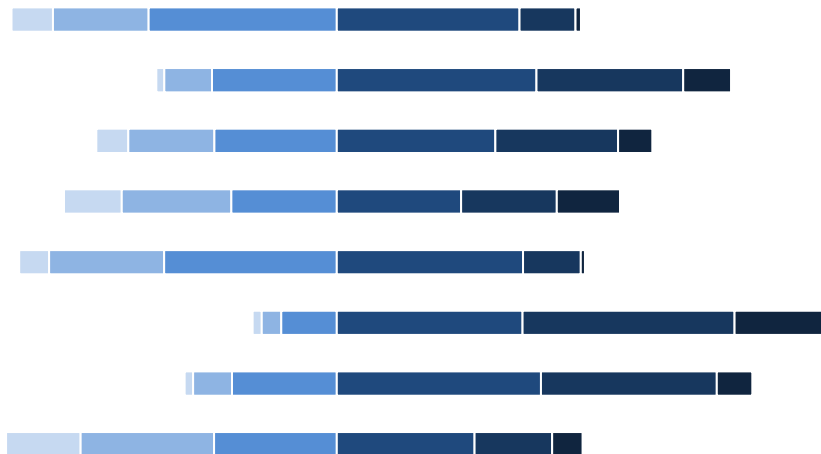
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11P42

11P27



main



PLS602

PLS595

PLS586

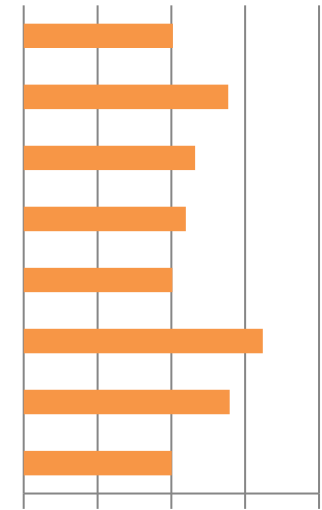
PLS576

Dancer

94195

14P56

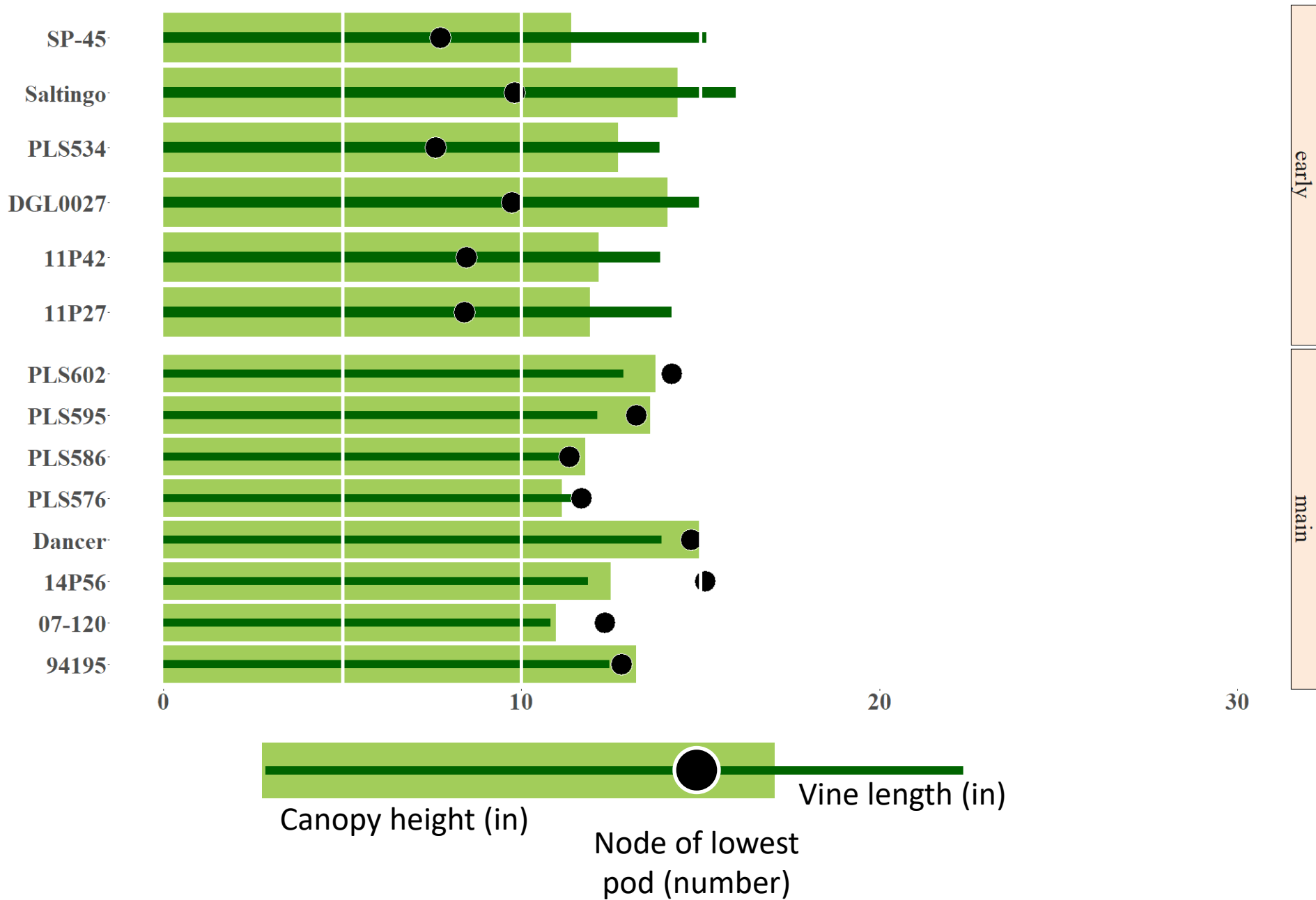
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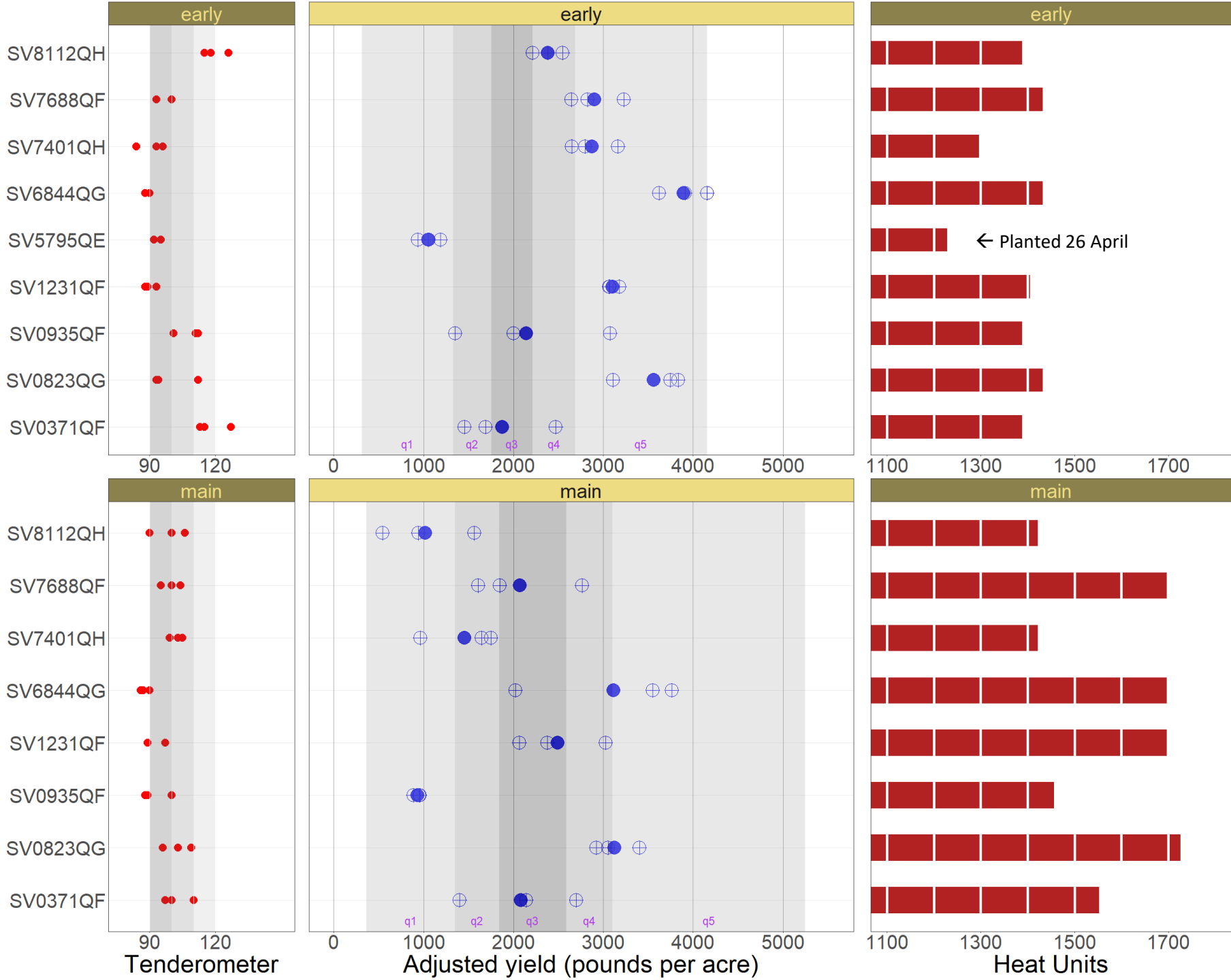
% of initial sieve sample

Sieve Index: 1 2 3 4 5

PURELINE



SEMINIS

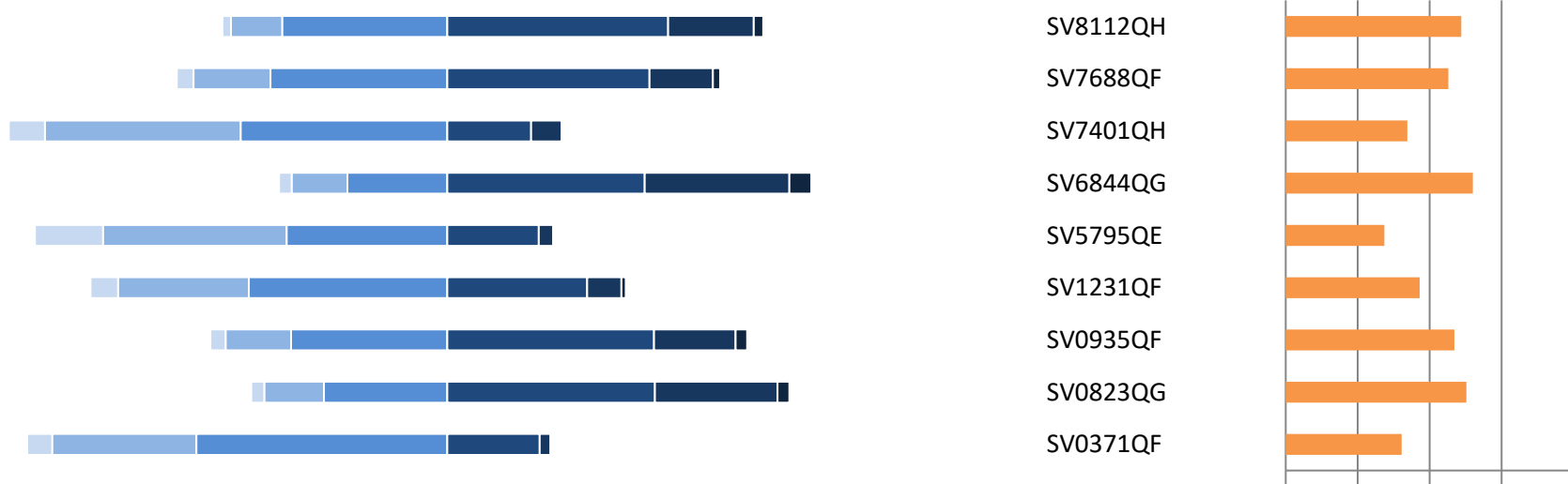


SEMINIS

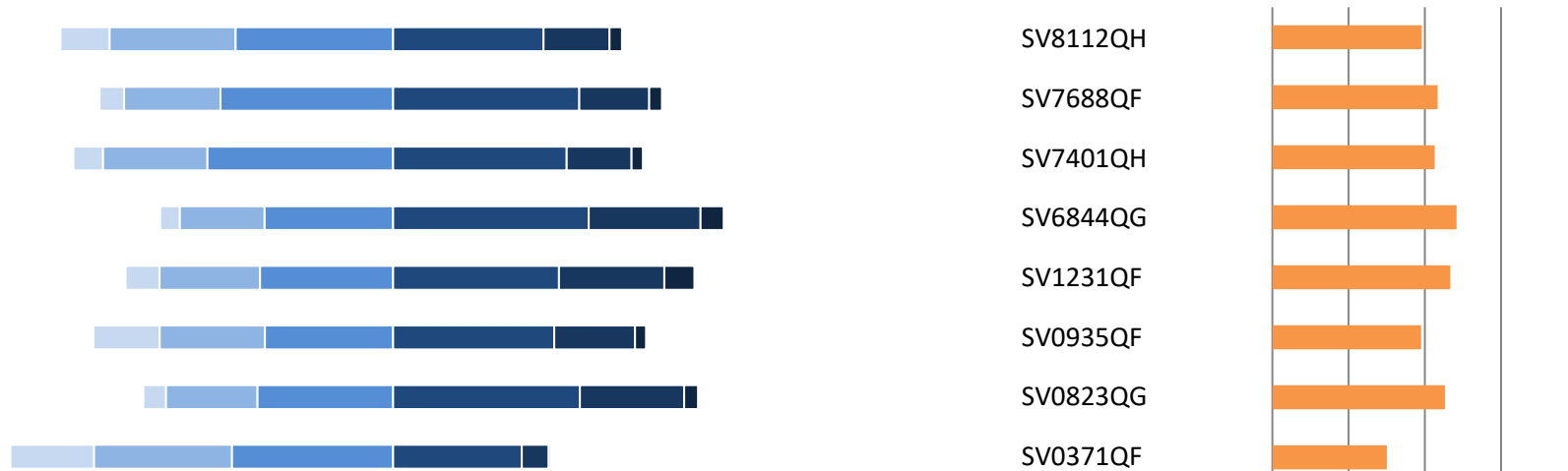
Sieve Size



early



main

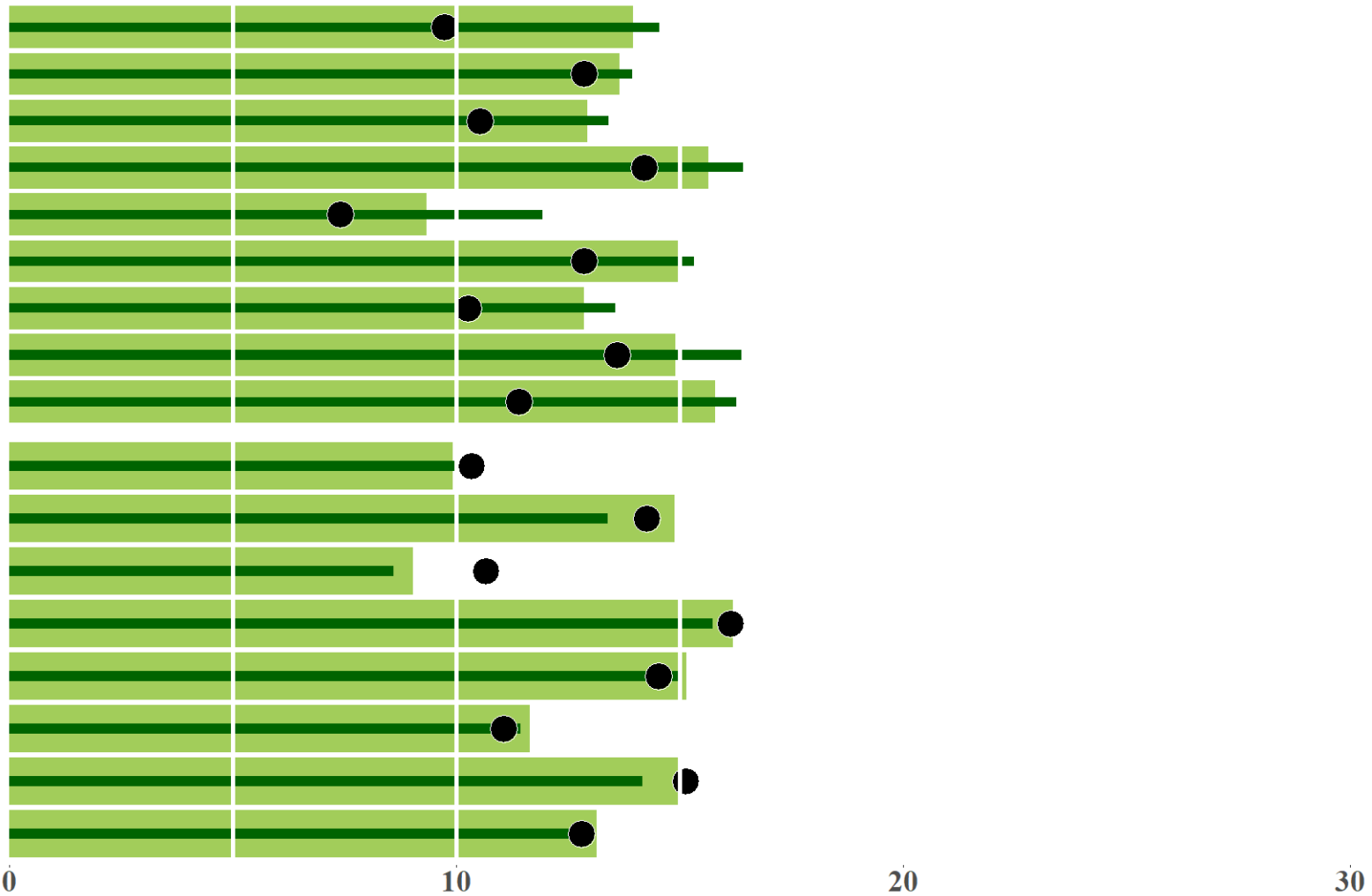


% of initial sieve sample

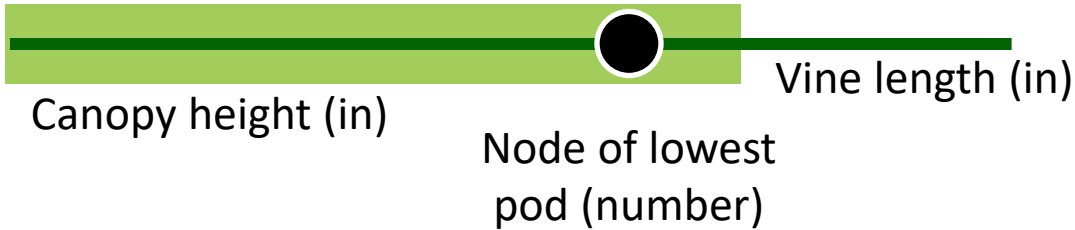
Sieve Index: 1 2 3 4 5

SEMINIS

- SV8112QH
- SV7688QF
- SV7401QH
- SV6844QG
- SV5795QE
- SV1231QF
- SV0935QF
- SV0823QG
- SV0371QF
- SV8112QH
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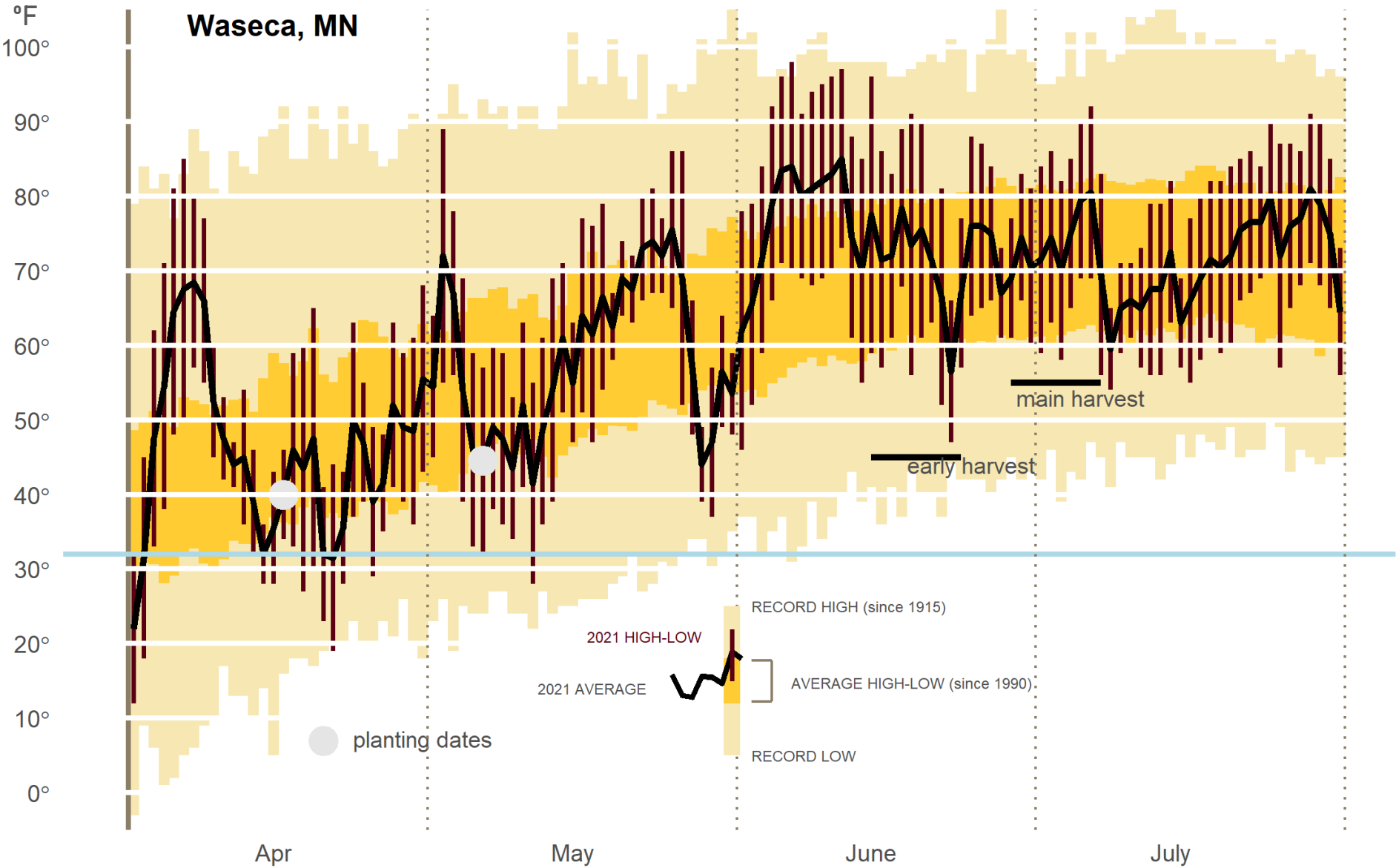


early
main



2021 Temperature

Waseca, MN



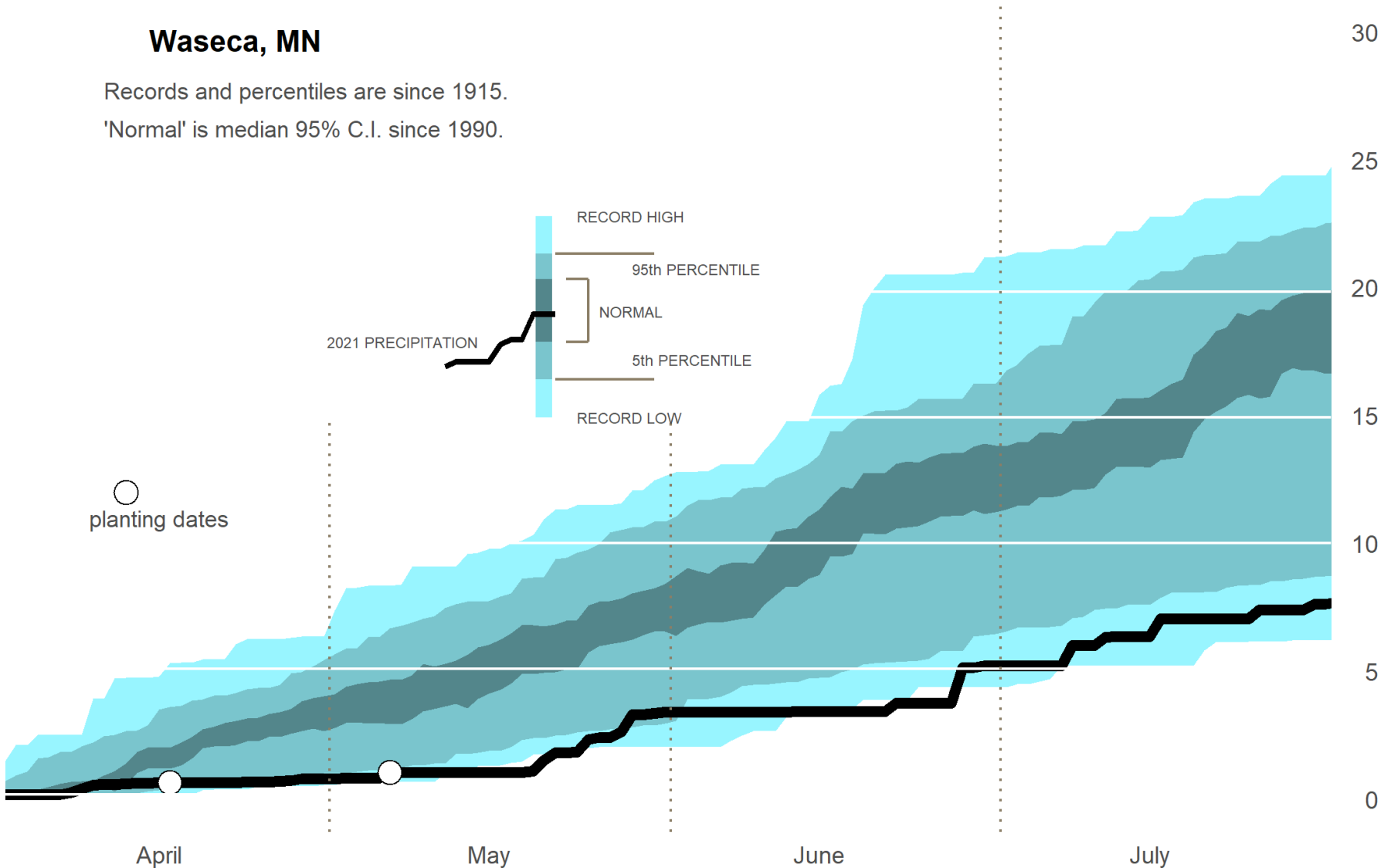
2021 Cumulative Precipitation (inches)

inches

Waseca, MN

Records and percentiles are since 1915.

'Normal' is median 95% C.I. since 1990.



**UNIVERSITY OF MINNESOTA
SOUTHERN RESEARCH AND OUTREACH CENTER
35838 120th Street
Waseca, MN 56093-4521
APRIL 2021**

Date	Air Temp.		HDD	Cumul* HDD	Precip	Cumul**		Snow Depth	Evap	Soil Temperatures						Wind mi.	Solar Radiation Langleys		
	Max.	Min.				Precip.	Snow			2"		4"		8"					
	-----°F-----									-----in.-----		Max	Min	Max	Min.			Max.	Min.
1	32	12	43.0	6025.5	T		T	-		41	33	40	35	41	38	41	40	183	259
2	45	18	33.5	6059.0	-					47	33	43	34	40	37	40	41	231	495
3	62	33	17.5	6076.5	-					50	35	46	37	42	38	40	41	404	482
4	71	38	10.5	6087.0	-					60	40	53	41	47	41	41	41	168	501
5	81	48	0.5	6087.5	-			1.10		62	45	57	45	49	45	43	41	205	452
6	85	50	0.0	6087.5	-					63	49	59	49	52	47	45	41	368	448
7	80	57	0.0	6087.5	0.08	4.20				66	54	62	54	55	51	47	42	218	363
8	77	55	0.0	6087.5	0.15	4.35				63	55	59	55	55	53	49	43	228	257
9	60	45	12.5	6100.0	0.14	4.49		0.80		59	50	57	51	54	51	50	43	183	171
10	53	42	17.5	6117.5	0.04	4.53				53	46	52	47	51	49	49	44	201	130
11	47	41	21.0	6138.5	-					49	45	49	46	49	47	48	45	244	137
12	54	36	20.0	6158.5	0.01	4.54		0.19		55	45	52	45	49	46	47	45	207	262
13	46	32	26.0	6184.5	0.02	4.56				48	40	47	43	47	45	47	45	325	136
14	36	28	33.0	6217.5	0.01	4.57	0.2			44	38	43	40	45	42	46	45	281	174
15	43	28	29.5	6247.0	0.02	4.59	T			44	38	43	40	43	42	44	45	205	175
16	46	34	25.0	6272.0	-			0.27		47	39	46	41	44	42	44	45	140	204
17	59	33	19.0	6291.0	-					56	42	51	43	47	43	44	44	134	376
18	60	27	21.5	6312.5	-					60	42	55	44	49	45	45	44	124	489
19	65	30	17.5	6330.0	T			0.55		59	42	55	45	50	46	46	44	260	449
20	41	23	33.0	6363.0	-					50	39	49	42	48	44	47	45	191	287
21	44	19	33.5	6396.5	-					52	37	49	41	46	43	46	45	156	415
22	43	28	29.5	6426.0	T		T			49	37	47	40	45	43	45	45	183	432
23	63	37	15.0	6441.0	0.02	4.61		0.59		58	39	53	41	48	43	45	45	246	558
24	55	39	18.0	6459.0	0.02	4.63				49	45	48	46	47	46	46	45	195	102
25	49	29	26.0	6485.0	T					51	40	49	42	47	45	46	45	179	327
26	48	35	23.5	6508.5	0.02	4.65	T	0.24		46	40	45	42	45	44	45	45	374	202
27	63	41	13.0	6521.5	0.01	4.66				52	44	50	44	47	44	45	45	309	211
28	59	39	16.0	6537.5	0.08	4.74				53	45	50	46	48	46	46	45	275	221
29	61	36	16.5	6554.0	-					58	45	54	46	49	46	46	45	101	327
30	68	43	9.5	6563.5	-			0.62		63	46	58	47	52	47	47	45	223	593
Total	56.5	35.2	581.0	6563.5	0.62	4.74	0.2	4.36		53.6	42.3	50.7	43.7	47.7	44.6			6741	9635
Avg.	45.9									47.9		47.2		46.2		45.3	43.8		
Dept. from Normal	0.8		10.0	-396.5	-2.68	-3.28	-2.8			2.0		2.7		3.9		4.7			-1851

**UNIVERSITY OF MINNESOTA
SOUTHERN RESEARCH AND OUTREACH CENTER
35838 120TH STREET
WASECA, MINNESOTA 56093-4521
May 2021**

Date	Air Temp.		GDU	Cumul.* GDU	Precip.	Cumul.** Precip.	Evap.	Soil Temperatures								Wind mi.	Solar Radiation Langleys
	Max.	Min.						2"		4"		8"		20"	40"		
	----- ° F -----							Max.	Min.	Max.	Min.	Max.	Min.	----- ° F -----			
1	64	45	7.0	7.0	-			66	49	60	50	54	50	49	45	243	567
2	89	55	20.5	27.5	0.02	4.76		67	54	63	54	57	52	50	46	185	380
3	78	56	17.0	44.5	T		0.81	64	56	61	56	57	55	52	46	228	289
4	69	39	9.5	54.0	-			67	52	64	55	58	55	53	47	291	508
5	59	33	4.5	58.5	-			65	49	62	52	57	54	53	47	185	601
6	57	32	3.5	62.0	0.25	5.01		59	45	57	48	54	51	53	48	136	271
7	60	38	5.0	67.0	-			61	45	57	48	53	50	52	48	189	498
8	59	36	4.5	71.5	-			65	47	60	50	55	51	52	48	192	608
9	53	34	1.5	73.0	-			54	46	53	48	52	50	52	49	190	243
10	63	41	6.5	79.5	-		1.42	64	46	60	48	54	50	51	49	215	544
11	55	28	2.5	82.0	-			61	46	58	49	54	51	52	49	190	469
12	61	36	5.5	87.5	-			67	46	62	49	55	50	52	49	124	635
13	69	39	9.5	97.0	-			69	50	64	52	57	52	52	49	129	603
14	71	51	11.0	108.0	-		0.91	67	52	63	54	57	54	53	49	263	591
15	63	47	6.5	114.5	-			58	52	57	54	56	54	54	49	216	144
16	77	51	14.0	128.5	T			71	52	67	54	60	54	54	50	181	564
17	76	47	13.0	141.5	-		0.61	71	57	67	58	61	57	55	50	176	511
18	79	54	16.5	158.0	-			72	57	68	58	62	58	56	50	228	539
19	67	58	12.5	170.5	0.05	5.06		63	60	62	60	60	59	57	51	255	128
20	74	64	19.0	189.5	0.42	5.48		67	61	64	60	61	59	57	51	258	212
21	72	63	17.5	207.0	0.30	5.78		67	62	65	62	62	60	57	52	268	174
22	80	66	23.0	230.0	-			70	63	67	63	63	61	58	52	303	316
23	81	67	24.0	254.0	0.03	5.81		72	64	69	64	65	62	59	52	243	394
24	77	67	22.0	276.0	0.51	6.32	0.95	74	65	71	65	66	63	60	53	185	322
25	86	65	25.5	301.5	0.06	6.38		75	65	71	65	66	64	61	53	303	427
26	86	52	19.0	320.5	-			77	61	74	63	67	64	61	54	293	536
27	66	48	8.0	328.5	0.24	6.62		79	59	73	62	67	63	62	54	229	562
28	49	39	0.0	328.5	0.68	7.30		59	48	62	51	63	55	61	55	359	106
29	57	37	3.5	332.0	-			61	47	59	50	56	54	58	55	174	469
30	64	49	7.0	339.0	0.04	7.34		65	47	62	52	58	53	56	55	187	586
31	59	48	4.5	343.5	0.06	7.40	1.64	58	51	57	53	56	55	56	54	224	172
Total	68.4	47.9	343.5	343.5	2.66	7.40	6.3	66.3	53.4	63.2	55.1	58.8	55.5			6842	12969
Avg.	58.1							59.8		59.1		57.1		55.1	50.3		
Dept. from Normal	0.2		16.5	16.5	-1.81	-5.09	-0.46	-0.4		1.1		1.2		1.4			-1161

* Since May 1, 2021

** Since Jan. 1, 2021

**UNIVERSITY OF MINNESOTA
SOUTHERN RESEARCH AND OUTREACH CENTER
35838 120TH STREET
WASECA, MINNESOTA 56093-4521
June 2021**

Date	Air Temp.		GDU	Cumul.* GDU	Precip.	Cumul.** Precip. in.	Evap.	Soil Temperatures						20"	40"	Wind mi.	Solar Radiation Langleys
	Max.	Min.						2"		4"		8"					
	----- °F -----							Max.	Min.	Max.	Min.	Max.	Min.				
1	78	46	14.0	357.5	-		0.22	74	52	68	53	61	54	56	54	141	621
2	79	52	15.5	373.0	-		0.30	81	55	74	57	65	58	58	54	108	659
3	84	59	21.5	394.5	-			78	60	74	62	66	61	60	54	137	504
4	92	66	26.0	420.5	-			81	64	77	65	69	63	61	54	294	598
5	96	71	28.5	449.0	-			85	67	81	68	68	71	66	63	331	642
6	98	70	28.0	477.0	-			86	71	82	72	73	69	65	55	342	636
7	91	69	27.5	504.5	-		2.39	84	72	81	73	73	71	66	56	372	620
8	94	68	27.0	531.5	-			87	72	83	73	75	71	67	57	198	595
9	95	69	27.5	559.0	-			90	73	85	74	76	72	68	58	130	302
10	96	70	28.0	587.0	-			92	75	86	76	77	73	69	58	160	620
11	97	73	29.5	616.5	-		1.20	92	76	87	77	78	74	70	58	141	567
12	88	61	23.5	640.0	0.03	7.43		87	72	83	74	77	74	71	60	199	491
13	85	55	20.0	660.0	-			88	69	83	72	76	73	71	60	139	681
14	96	59	22.5	682.5	-		1.61	88	70	84	72	76	72	70	61	202	658
15	86	57	21.5	704.0	-			88	70	84	72	76	73	70	61	149	669
16	83	61	22.0	726.0	-		0.83	88	70	83	72	76	72	70	62	161	663
17	89	68	27.0	753.0	-			88	71	84	72	76	72	70	62	205	625
18	91	56	21.0	774.0	-			85	71	83	74	76	73	71	62	161	447
19	90	61	23.5	797.5	-			91	71	86	73	77	73	71	62	137	657
20	80	63	21.5	819.0	-			89	73	85	75	78	74	72	63	146	644
21	81	52	16.5	835.5	0.35	7.78	1.63	79	63	77	66	75	70	71	63	258	299
22	66	47	8.0	843.5	-			77	62	75	65	71	67	70	63	164	582
23	77	57	17.0	860.5	-			84	62	80	65	72	67	68	63	158	632
24	88	64	25.0	885.5	-			87	67	82	69	74	69	69	63	244	625
25	87	65	25.5	911.0	-		1.17	87	72	83	74	76	73	70	63	180	441
26	84	66	25.0	936.0	-			87	72	83	73	76	73	71	63	158	542
27	73	61	17.0	953.0	1.50	9.28		75	67	75	69	74	70	71	63	138	108
28	77	61	19.0	972.0	0.02	9.30	0.73	79	67	76	69	72	70	69	64	101	388
29	83	66	24.5	996.5	0.10	9.40	0.19	80	67	77	69	72	69	69	64	110	457
30	81	60	20.5	1017.0	0.00			83	68	80	70	73	70	69	64	108	554
Total	86.2	61.8	673.5	1017.0	2.00	9.40	10.3	84.7	68.0	80.7	69.8	73.5	69.7			5472	16527
Avg.	74.0							76.4		75.3		71.6		68.0	60.2		
Dept. from Normal																	
	5.6		119.5	136.00	-3.38	-8.47	2.3	4.6		5.4		4.4		4.0			1153

* Since May 1, 2021

** Since Jan. 1, 2021

New record high maximum and minimum temperature.

2nd warmest June on record

10th driest June on record.

**UNIVERSITY OF MINNESOTA
SOUTHERN RESEARCH AND OUTREACH CENTER
35838 120TH STREET
WASECA, MINNESOTA 56093-4521
July 2021**

Date	Air Temp.		GDU	Cumul.* GDU	Cumul.** Precip.	Precip.	Evap.	Soil Temperatures								Wind mi.	Solar Radiation Langleys
	Max.	Min.						2"		4"		8"		20"	40"		
	----- °F -----							Max.	Min.	Max.	Min.	Max.	Min.	----- ° F -----			
1	84	59	21.5	1038.5	-		0.26	89	68	84	70	76	70	70	64	80	603
2	86	63	24.5	1063.0	-			91	70	86	72	77	72	71	64	123	564
3	82	58	20.0	1083.0	-			90	72	86	74	78	73	72	64	97	638
4	85	65	25.0	1108.0	-			89	72	85	74	78	74	72	64	150	593
5	90	69	27.5	1135.5	-		1.20	89	75	86	76	78	75	73	65	268	611
6	92	69	27.5	1163.0	0.02	9.42	0.29	94	76	90	77	81	76	74	65	90	587
7	83	56	19.5	1182.5	0.85	10.27	0.19	86	69	83	72	79	74	74	65	149	309
8	65	54	9.5	1192.0	-			72	63	72	66	74	69	73	66	143	243
9	71	59	15.0	1207.0	0.01	10.28	0.22	77	63	75	66	72	69	70	66	105	456
10	71	61	16.0	1223.0	0.36	10.64		73	65	71	67	70	68	70	66	151	222
11	73	57	15.0	1238.0	0.03	10.67		71	63	70	65	69	67	69	65	94	239
12	79	56	17.5	1255.5	-		0.44	80	63	77	65	71	67	68	65	95	626
13	79	56	17.5	1273.0	-		0.23	86	64	81	66	73	68	69	65	79	631
14	82	63	22.5	1295.5	-			87	67	82	69	75	70	70	65	124	531
15	69	57	13.0	1308.5	0.75	11.42	0.26	71	64	72	66	72	68	70	65	116	87
16	77	55	16.0	1324.5	-			79	64	76	66	72	68	69	65	79	554
17	80	58	19.0	1343.5	-			81	64	79	66	73	68	69	65	91	592
18	82	61	21.5	1365.0	-			85	66	82	68	75	69	69	65	92	559
19	82	59	20.5	1385.5	-		0.86	88	69	83	71	76	71	70	65	80	562
20	84	60	22.0	1407.5	-			89	70	85	72	78	72	71	65	74	574
21	85	66	25.5	1433.0	-		0.47	88	72	85	74	78	74	72	65	108	532
22	86	67	26.5	1459.5	-			89	75	86	76	79	75	73	66	114	452
23	84	69	26.5	1486.0	0.01	11.43	0.39	84	74	82	76	78	76	73	66	195	392
24	90	70	28.0	1514.0	0.38	11.81		90	74	86	75	79	75	74	66	190	513
25	87	57	21.5	1535.5	-			88	70	85	73	79	75	74	67	91	595
26	87	65	25.5	1561.0	T		0.95	92	70	87	73	79	74	74	67	102	568
27	86	68	27.0	1588.0	T			87	74	84	76	79	76	74	67	187	403
28	91	71	28.5	1616.5	0.01	11.82	0.52	92	74	88	76	81	75	74	67	126	506
29	90	68	27.0	1643.5	0.22	12.04		86	75	84	77	79	77	75	68	188	399
30	85	65	25.0	1668.5	-		0.53	90	73	87	76	80	77	75	68	122	484
31	73	56	14.5	1683.0	0.09	12.13	0.05	77	66	77	69	77	72	75	68	61	191
Total	81.9	61.8	666.0	1683.0	2.73	12.13	6.9	84.8	69.2	81.8	71.3	76.3	72.1			3764	14816
Avg.	71.9							77.0		76.5		74.2		71.8	65.6		
Dept. from Normal																	
	0.5		5.0	141.00	-2.20	-10.67	-0.74	-1.7		-0.3		0.0		0.7			-1862

* Since May 1, 2021

** Since Jan. 1, 2021