



Plant Populations and Emergence Date Impacts on Bulb Variability

Dr. Dan Drost

Utah State University

dan.drost@usu.edu

2020 Utah Onion Assoc. Meeting

Brigham City, UT

Feb. 11



Background - What we know!



- Hatridge (1980-CA) - Yellow Swt Spanish
 - Increase density shifts productivity
 - Lower density: later maturity & bigger necks
 - Seed weight does not influence yield

Plants/ ft ²	Ave Bulb Size (in)	Fr. Wgt. (lb./ft ²)	% Med/Jum
0.7	3.9	0.6	3 / 96
3.7	3.1	2.1	12 / 85
7.4	2.5	2.5	47 / 53
9.3	2.4	2.8	68 / 32

← UT 6/ft²

Background - cont.



- Rumpel (2000-Poland) - European Long Day Types
 - Increase density hastens maturity
 - Increase density decreases larger sizes

Plants/ ft ²	Maturity (-days)	% Med / Jum
3.71	2	18 / 81
5.56	4	39 / 58
7.41	7	60 / 35
9.27	8	76 / 20
12.97	10	85 / 10

← UT 6/ft²

Background -



Shock (2015 - OR) - Yellow Swt Spanish

- Drip & Furrow performed the same
- Bulb diameter decrease as population increase
- Maximum return (\$) at 420,000 plants/A

Plants/ ft ²	Plants/ Acre	Medium (cwt/A)	Jumbo (cwt/A)	Colossal+ (cwt/A)
4.1	198,000	20	1075	478
6.1	263,700	172	1018	388
8.1	351,600	258	956	293
10.1	439,500	366	722	76
12.1	527,400	376	618	12

UT 6/ft²

Trial Set-up



2019 Trials - Kaysville

<u>In-row</u>	<u>plts/A</u>
2.0"	321,670
2.5"	257,340
3.0"	214,450
3.1"	307,530
3.75"	171,560
4.0"	160,840

37" bed; 2 double lines
Drip irrigated

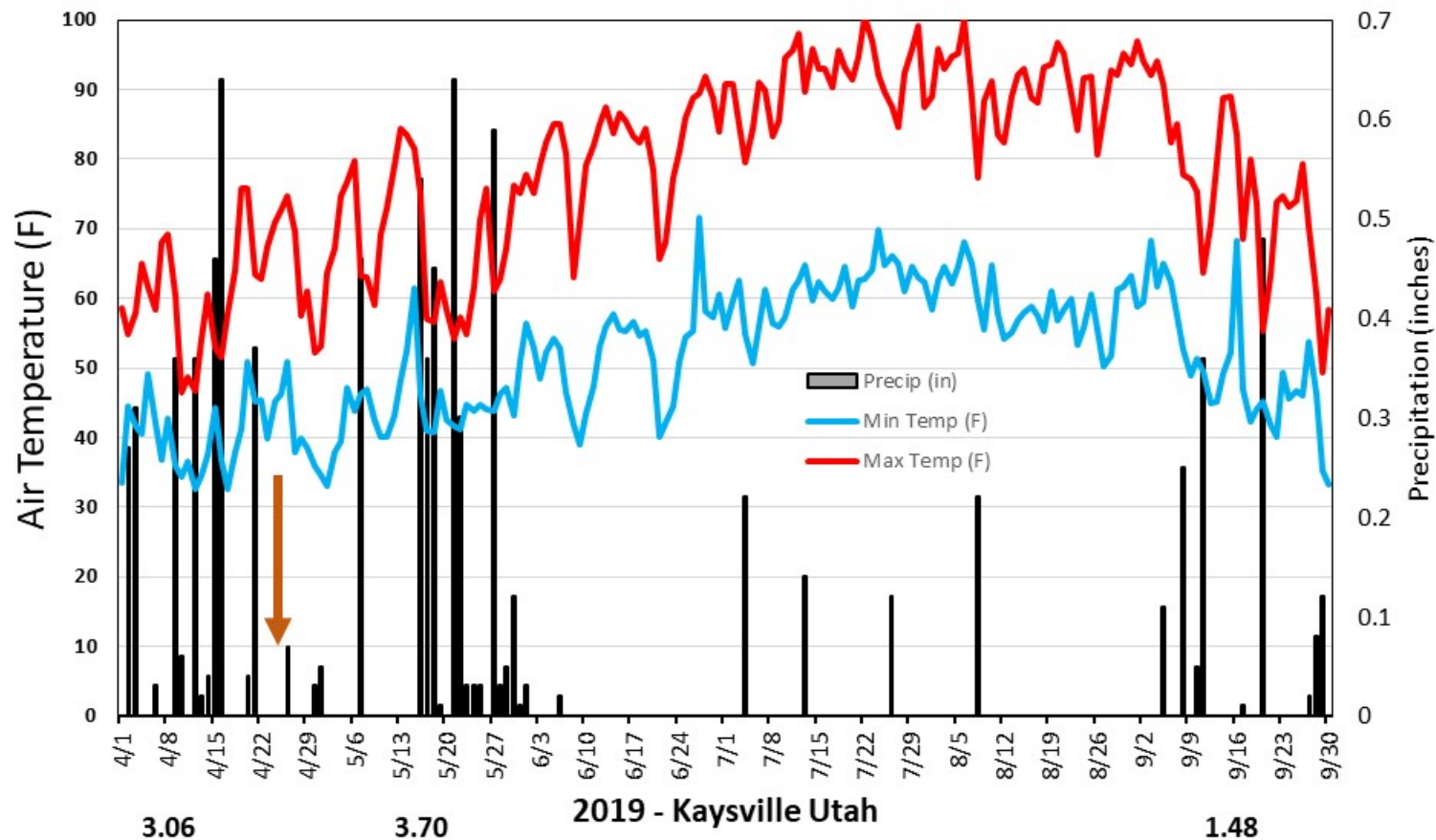
2019 - Climate - Kaysville



Planted:
April 25

Stands:
3-4 days

Growth:
10 days



Plant Population Study



Seed Drop	Population (#/A)	
	Seeds	Actuals
2.00"	321,674	163,350
2.50"	257,339	125,840
3.00"	214,449	110,110
3.10"	207,532	108,900
3.75"	171,559	102,850
4.00"	160,837	91,960
		L*

- Final Stands determined in June.
- Leaf counts and plant growth assessed in July
- Bulbs lifted - mid September.
- Graded in October
- Actuals: 51-55% of drop



2019 Yield Results - Mkt yld =

Spacing	Colossal	Jumbo	Medium	% Jumbo
2.00"	0	679	594	53%
2.50"	29	723	492	58%
3.00"	58	732	266	69%
3.10"	65	875	257	73%
3.75"	184	657	187	64%
4.00"	209	714	162	66%
	L*	Q*	L*	



Population Trial Conclusions



- Poor field conditions resulted in poor stands (50-55% of seed drop).
- No total yield differences
- Increase plant spacing  colossal  mediums
- Repeat study in 2020 - Looking for Farms!

Emergence Trial Set-up



Planted: 25 April -
Vaquero

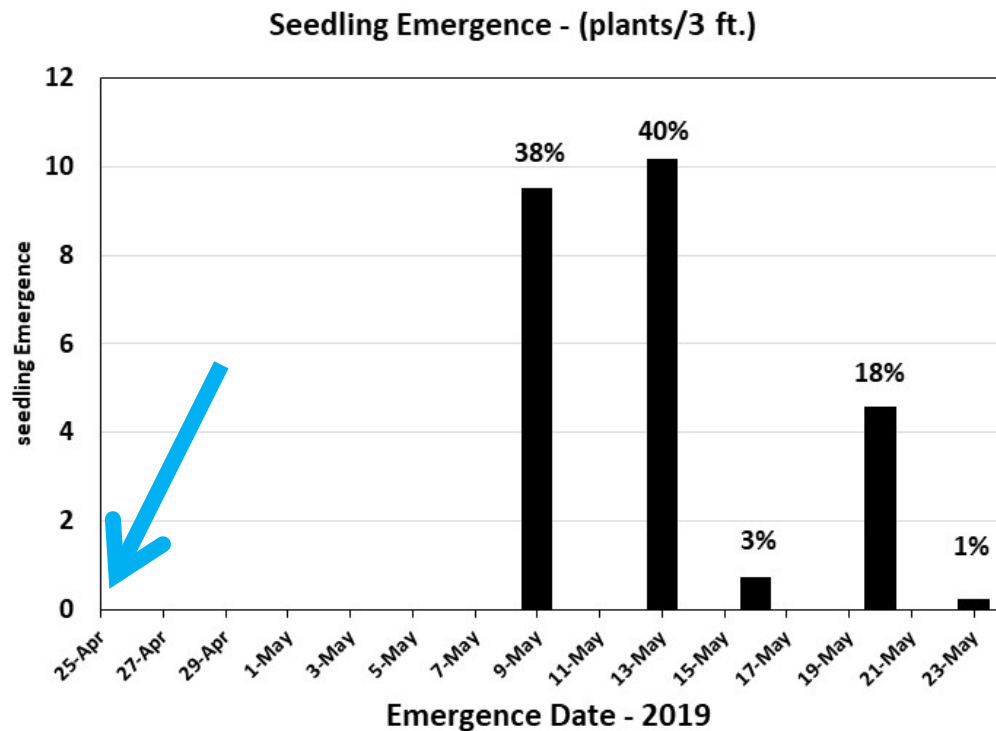
12 - 3 ft. sections tracked

Marked seedlings as they
emerged; tracked growth

37" bed; 2 double lines

Drip irrigated

Plant Emergence Study



- 14 days to emerge
- 78% emerge early
- 19% emerge late
- Actuals: 60% emerge

Tracking Growth - Digitally



June 3



June 21

continued growth

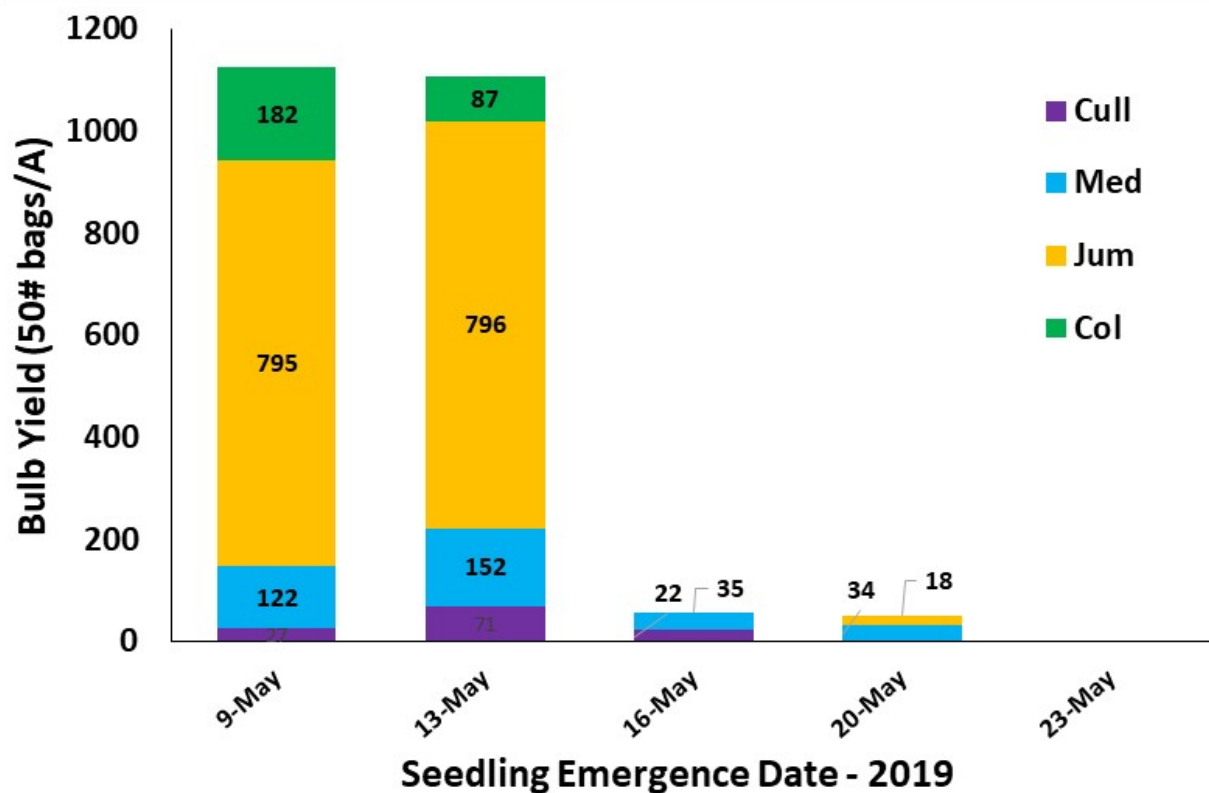


July 7

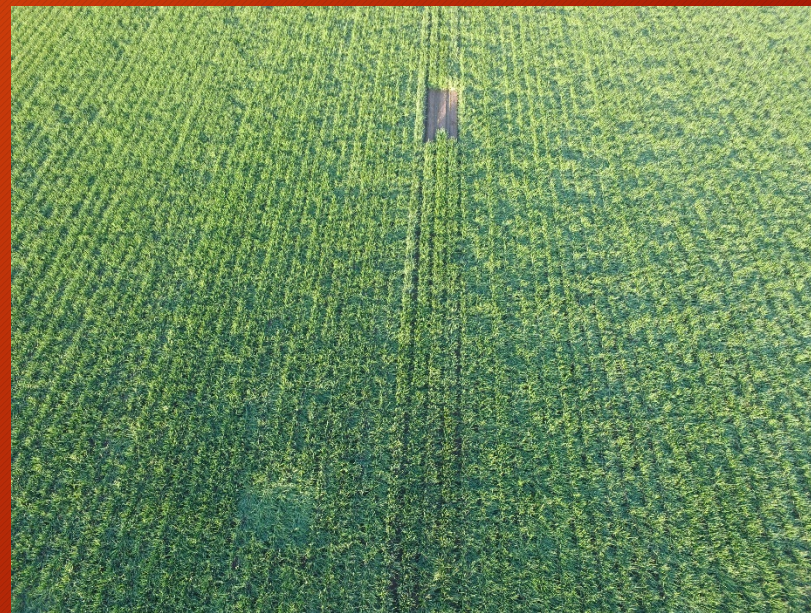
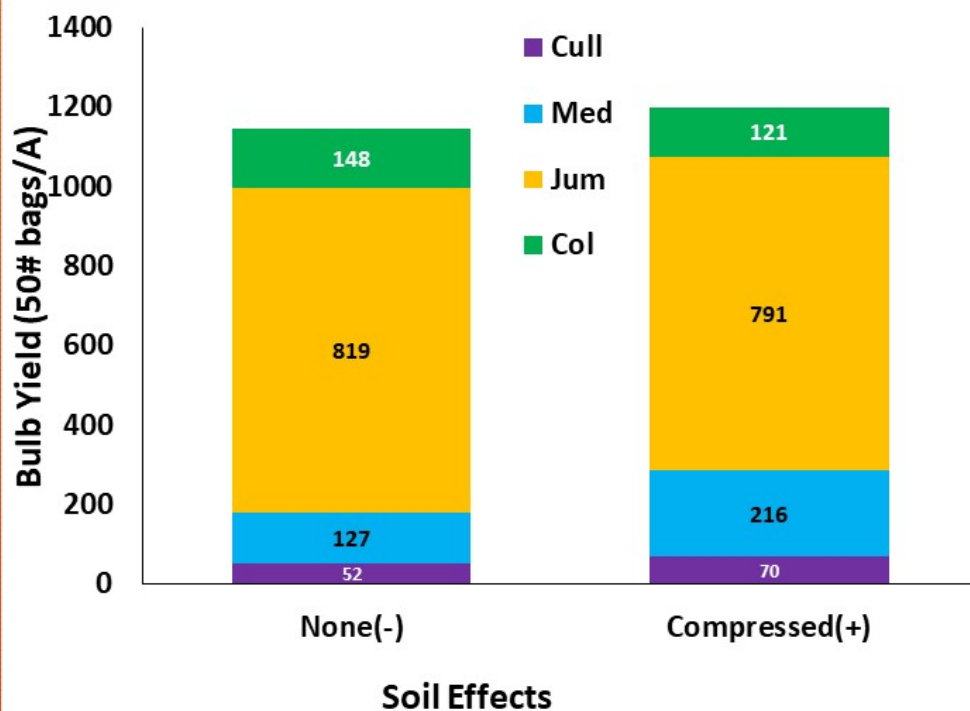


July 22

2019 Emergence Yield Results



Soil Compaction?



Emergence Trial Conclusions



- Seeds that emerge early grow better and produce higher yields.
- ~20% are slow/late emerging seeds.
- Tracking growth digitally difficult.
- Early emergence key to high yields.
- Soil Packing doesn't seem to matter.
- Repeat in 2020 - Looking for Farm sites!

Thank you

UtahState
UNIVERSITY

UTAH
AGRICULTURAL
EXPERIMENT STATION

