

## Summer Lettuce Variety Trial

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### Cooperators:

- **Jill Beebout** - Chariton
- **Carmen Black** - Solon
- **Rob Faux** - Tripoli
- **Alice McGary** - Ames
- **Jordan Scheibel** - Grinnell
- **Kate Edwards** - Iowa City

### Funding By:

**CERES**

### Web Link:

[http://bit.ly/pfi\\_horticulture](http://bit.ly/pfi_horticulture)

### In a Nutshell

- Six farmers compared three or four lettuce varieties, Coastal Star, Hampton, Magenta, and Muir, to determine which produces better during summer months (harvest July – Sept.) in Iowa.

### Key Findings

- Magenta had the highest yields on three of the six farms, and was much more heat tolerant than Coastal Star.
- Coastal Star produced sizeable heads – particularly in earlier successions – but tended to bolt quickly.
- Farmers found they could grow quality summer head lettuce using these varieties, though specific preferences differed by farm.

Project Timeline:

May 2017 – Sept. 2017



From left, lettuce variety trials at Faux, Beebout and Black.

### Background

For diversified vegetable farmers with CSA, leafy greens need to go in the box every week. For farmers at market, the demand for head lettuce is constant. But for all farmers, there is a point in the high summer of July and August when greens are difficult to grow – they bolt quickly, sending their energy, and sugars, toward reproduction. Even if greens might appear marketable, they are often bitter-tasting. “There’s always a few CSA boxes in July that it feels difficult to fill, so having lettuce longer in the season will be really helpful to keep up the variety before the late summer crops like tomatoes and sweet corn come in,” says Carmen Black. This sentiment was echoed by Kate Edwards, “Midsummer lettuce has the potential to

add diversity during the summer for the CSA share.”

To meet the desires of their customers, farmers are interested in finding varieties of head lettuce most tolerant to the heat of summer that taste acceptable, and work in their production system. Salanova, the innovative small-headed varieties from Johnny’s Seeds, are preferred by many growers for their ease of harvest and use in baby-leaf salad mix (Johnny’s Seeds, 2017). Salanova, however, is an expensive seed. Farmers were curious to put larger, full head lettuce varieties to the test. Jordan Scheibel said, “In 2016, I experimented with growing Salanova lettuces over the summer months using shade cloth. I thought it was fairly successful and it allowed me to market lettuce mix through my CSA and farmers market with fewer

gaps. When I saw there was interest from other growers in finding out what lettuce varieties might work for summer growing, I thought this would be a good project to be a part of.”

West Virginia University produced a thorough report on extended season lettuce production in 2012, which looked at 30 varieties. In their heat tolerance evaluation, white plastic mulch was used in an open field for lettuce harvested in early September; each variety had incidence of bolting and tip burn (Jett, 2012). That trial included Coastal Star – most of the seeds in the trial were from Seeds of Italy, Johnny’s Seeds, Baker Creek Seeds, Rupp Seeds, and Harris Seeds. The best performers in the midsummer trial included Nevada, Nancy, Rex, Sierra, Helvius, Coastal Star, and Regina delle Ghiacchi (Jett, 2012).

In the present trial, a group of farmers chose three or four varieties (Coastal Star, Hampton, Magenta, Muir) to compare during 2017. These varieties were selected because of positive farmer experience, the varietal similarities, and the availability of organic and untreated seed. Information about each variety is available in **Table 1**.

**Table 1**

<b>Lettuce Varieties used in Trial</b>				
<b>Variety</b>	<b>Seed Source</b>	<b>Type</b>	<b>Days to Maturity</b>	<b>\$/1,000 seeds (pelleted)</b>
<b>Coastal Star</b>	Johnny's	Romaine, Green	57	\$5.20 (organic)
<b>Hampton</b>	High Mowing	Oakleaf	Not provided	\$10.25 (organic)
<b>Magenta</b>	Johnny's	Summer Crisp, Red	48	\$9.07 (conventional)
<b>Muir</b>	Johnny's	Summer Crisp, Green	50	\$9.24 (organic)

**Methods**

This project was conducted at six Iowa farms: Jill Beebout (Blue Gate Farm in Chariton), Carmen Black (Sundog Farm in Solon), Kate Edwards (Wild Woods Farm in Iowa City), Rob Faux (Genuine Faux Farm in Tripoli), Alice McGary (Mustard Seed Community Farm in Ames), and Jordan Scheibel (Middle Way Farm in Grinnell).

Most farmers planted four replications of three lettuce varieties in a randomized, replicated trial (some farmers accidentally bulk harvested; one farmer used four varieties). Several farms also chose to do multiple successions of crops, to test different parts of the summer season. Production practices including mulch, spacing, irrigation, and planting and harvest times were determined by farm, and detailed in **Table 2**. In replicated trials, plants per plot ranged from 10 – 20, and spacing between rows and within-row was not more than 12 in. on any farm. All farms transplanted lettuce to the field, and all farms trialed the varieties Coastal Star, Magenta and Muir; one farmer also included Hampton.

**Table 2**

<b>Production Practices and Trial Design by Farm</b>						
<b>Farm</b>	<b>Jill Beebout</b>	<b>Carmen Black</b>	<b>Kate Edwards</b>	<b>Rob Faux</b>	<b>Alice McGary</b>	<b>Jordan Scheibel</b>
<b>Varieties Used</b>	Coastal Star, Magenta, Muir	Coastal Star, Magenta, Muir	Coastal Star, Magenta, Muir	Coastal Star, Magenta, Muir	Coastal Star, Magenta, Muir	Coastal Star, Hampton, Magenta, Muir
<b># Successions</b>	4	2	2	1	1	1
<b># Replications / Succession</b>	1	4	4	1	4	4
<b>Start Date, Transplant Date</b>	S1: May 10, June 1; S2: May 22, July 3; S3: June 11, July 13; S4: July 9, Aug. 8	S1: May 7, June 6; S2: May 28, June 20	S1: May 11, June 14; S2: May 29, June 30	June 4; July 15	April 26, June 2	May 1, June 23
<b>In-Row Spacing</b>	12 in.	7 in.	8.2 in.	6 in.	9 in.	10 in.
<b>Btwn-Row Spacing</b>	12 in.	7 in.	7.5 in.	24 in.	12 in.	12 in.
<b>Configuration</b>	3 rows / 40 in. bed	5 rows / 36 in. bed	4 rows / 30 in. bed	Single rows	Single rows	3 rows / 30 in. bed
<b>Mulch / Shade Cloth</b>	N/N	N/N	Y – Fabric / N	N/N	N/N	N / Y
<b>Irrigation Type / rate / emitter spacing</b>	Drip / 0.5 gal/min. / 8 in.	Drip	Drip / 1 gal/min. / 3 in.	Drip	Hand-watered at planting, establishment, once more (4 times total)	Drip
<b>Harvest Window</b>	S1: July 18 – Aug. 1; S2: Aug. 8 – Aug. 29; S3: Aug. 25 – Sept. 12; S4: Sept. 15 – Sept. 26	S1: July 8 – July 14; S2: July 19 – July 25	S1: July 12; S2: July 19	Aug. 24 – Sept. 19	July 4 – July 14	July 24 – July 31
<b>Plot ft<sup>2</sup></b>	100	S1: 7; S2: 10.5	8.5	100 - 150	9.75	10

Farmers harvested and field-cleaned lettuce heads, then recorded the weight and count of lettuce heads harvested per plot. They also scored the plot as Acceptable (A) or Unacceptable (U) for quality indicators: bolting, tip burn, bottom rot and flavor. Farmers also tracked irrigation information.

Data were analyzed using JMP Pro 12 (SAS Institute Inc., Cary, NC) and comparisons among measured variables employ least squares means for accuracy. Mean separations among variety, by succession, at each farm were compared using Tukey's least significant difference (LSD) to examine its effect on lettuce yield. Statistical significance is reported at the  $P \leq 0.10$  level.

## Results and Discussion

Monthly rainfall and growing degree days for the current year and historical averages are reported from the nearest weather station to each farm (**Table 3**).

Across sites, weather in 2017 was characterized by a cool August and warm September. June was also warm at Ames (McGary). Values in **Table 3** are bold where monthly growing degree days for 2017 were more than one standard deviation from the historical average. Rainfall differed greatly by farm, with some farms having drought conditions in June (Beebout), while for McGary rainfall was nearly double the historical average in July. Because most farms use irrigation, wet conditions are more difficult to work through than dry conditions. Where precipitation in 2017 was more than two inches different than the average, values are displayed in bold in **Table 3**.

**Table 3**

**Monthly Precipitation (in.) and Growing Degree Days (GDD) (base 50°F)<sup>a</sup>**

Month	Jill Beebout, Chariton				Rob Faux, Tripoli				Black, Edwards, Quee, West Branch				McGary, Ames				Scheibel, Grinnell			
	Growing Degree Days (base 50°F)		Monthly Precipitation Total, inches		Growing Degree Days (base 50°F)		Monthly Precipitation Total, inches		Growing Degree Days (base 50°F)		Monthly Precipitation Total, inches		Growing Degree Days (base 50°F)		Monthly Precipitation Total, inches		Growing Degree Days (base 50°F)		Monthly Precipitation Total, inches	
	2017	Avg.	2017	Avg.	2017	Avg.	2017	Avg.	2017	Avg.	2017	Avg.	2017	Avg.	2017	Avg.	2017	Avg.	2017	Avg.
June	594	596	3.16	4.94	6.43	4.92	601	562	613	616	3.52	4.73	<b>664</b>	<b>591</b>	<b>1.90</b>	<b>4.78</b>	588	573	3.39	4.56
July	746	723	<b>0.70</b>	<b>4.48</b>	<b>8.30</b>	<b>4.66</b>	697	675	734	741	<b>8.27</b>	<b>4.37</b>	769	716	<b>1.47</b>	<b>3.68</b>	711	705	2.87	3.81
Aug.	<b>590</b>	<b>674</b>	2.50	4.19	<b>1.75</b>	<b>4.41</b>	<b>532</b>	<b>619</b>	<b>563</b>	<b>690</b>	3.25	3.93	<b>589</b>	<b>661</b>	3.64	3.99	592	650	4.28	3.86
Sept.	533	472	3.15	4.03	2.49	3.27	<b>501</b>	<b>412</b>	513	489	<b>1.35</b>	<b>3.60</b>	<b>545</b>	<b>460</b>	2.92	3.60	<b>538</b>	<b>449</b>	2.20	3.80

<sup>a</sup> Climate data were accessed from the Chariton (120 years, Beebout), Tripoli (120 years, Faux), Iowa City (120 years, Black, Edwards and Quee), Ames (120 years, McGary), and Grinnell (120 years, Scheibel) weather stations (Iowa Environmental Mesonet, 2017).

GDD (Base 50) values in bold indicate that the 2017 value was more than one standard deviation from the historical average. Where precipitation data is displayed in bold, 2017 values were more than 2 inches different from the historical average.



An employee at Beebout's shows off Muir. Muir was their top-yielding variety during their second succession.

## Yield Across Farms

Despite mixed success with germination of some varieties, all farms reported the summer lettuce produced well in their system. Mean yield by variety and succession on each farm are shown in **Figure 2**. Yields are reported in Figure 2 in lb/ft<sup>2</sup>, which at a broad glance appears drastically different by farm, with the highest yields reaching 1 lb/ft<sup>2</sup>, while the lowest is 0.05 lb/ft<sup>2</sup>. Both farms (Black and Faux) had successful lettuce seasons – the difference is attributed to their field spacing. For example, Black grows in a tight 7 in. x 7 in. spaced bed, while Faux’s field worked out such that he grew a single row of lettuce in half a bed, providing 24 in. between-row spacing.

Coastal Star produced sizeable heads – particularly in earlier successions – but tended to bolt quickly. McGary, who had the earliest harvest, along with Black’s first succession, had the best yields of Coastal Star among all locations. Coastal Star also performed well at Edwards. For later season crops (late July, August and September), Magenta performed superbly. Magenta had the highest yields on three of the six farms, including Beebout (successions 1, 3 and 4), Black (successions 1 and 2), and Scheibel. All farms reported that Magenta was much more heat tolerant than Coastal Star. Muir performed moderately well, but tended to have more issues with bottom rot. At Beebout (succession 2), Black (succession 1) and Scheibel, Muir yield surpassed or equaled the other varieties. Detailed results and observations from each farm are provided below.

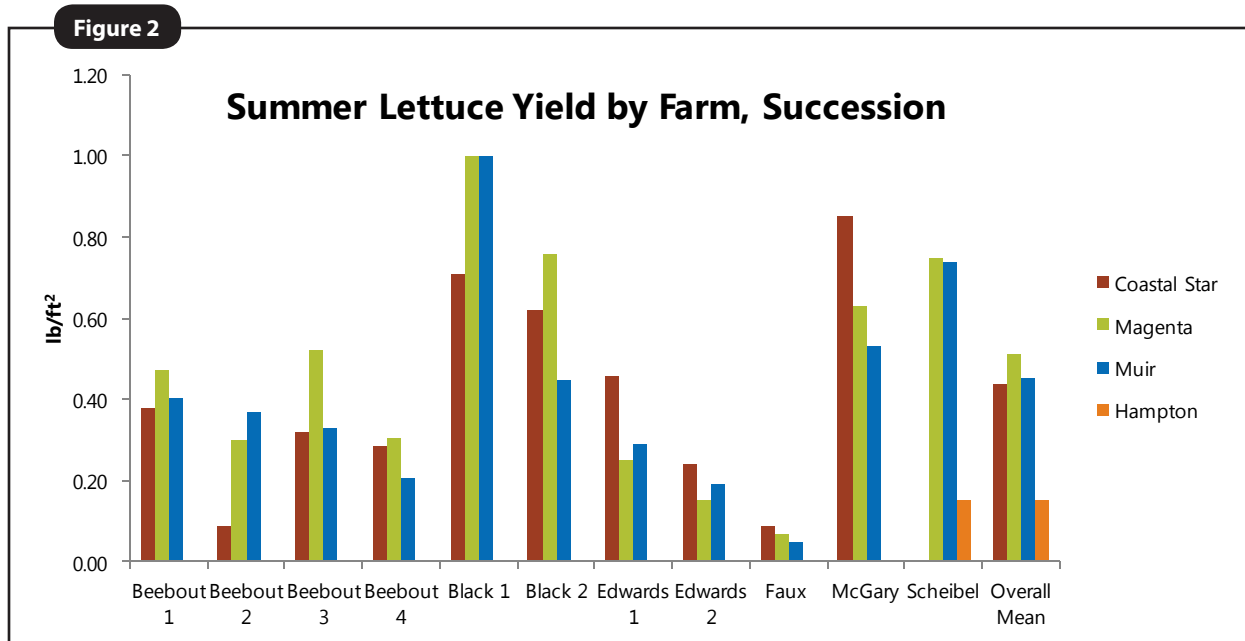


Figure 2: Lettuce Yield by Farm, Succession. Average yields (lb/ft<sup>2</sup>) for each variety, by succession and farm are compared. The “Mean” value at the far right is the average of all farms and successions.



Coastal Star at Edwards’s.

## Yield at Each Farm

Beebout, Chariton (Figure 4, Table 4)

### Yield

Beebout planted four successions of summer lettuce, beginning harvest July 18 and concluding Sept. 26. Yields for each variety by succession are shown in **Figure 4**. Magenta typically had the highest yield, ranging from 0.30 – 0.52 lb/ft<sup>2</sup>. This was due to its consistency – Magenta had fewer issues with bottom rot than Muir, and less bolting than Coastal Star. Coastal Star and Muir had the largest heads, with the first and third successions of Coastal Star growing the largest, to an average of 0.73 and 0.89 lb/head. Beebout drip irrigated her plots as needed, typically for 2 hours at a time. She irrigated succession 1 and succession 4 11 times each, succession 2 was irrigated 16 times and succession 3 was irrigated 17 times.

### Quality

Though flavor for all varieties was good throughout the trial, Beebout found Coastal Star bolted most often, and was particularly bad in August and September (successions 2–3). Muir and Magenta both had issues with bottom rot later in the season.

“This trial fundamentally changed the way we think about summer lettuce. It encouraged us to experiment with varieties we hadn’t used before, and we had success. These varieties filled a void in our CSA and market offerings,” said Beebout. She plans to add these varieties to their high summer crops in 2018.

**Figure 4**

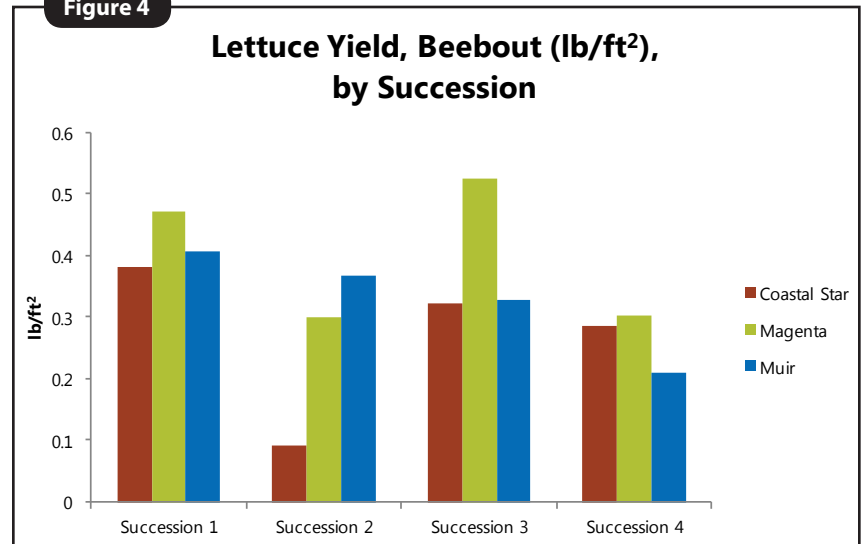


Figure 4: Lettuce yield in lb/ft<sup>2</sup> at Beebout by variety and succession. The number next to the varietal name is the succession (Succession 1 on the left side of the figure). Because Beebout bulk-harvested by variety, no statistical analysis was performed.

**Table 4**

## Yield and Quality Characteristics for Summer Lettuce at Beebout’s

Beebout <sup>b</sup>	Yield				Quality			
	Variety	Yield (lb/ft <sup>2</sup> )	Head Yield (heads/ft <sup>2</sup> )	Head Weight (lb/head)	"A" Bolting	"A" Tip Burn	"A" Bottom Rot	"A" Flavor
Succession 1 (July 18-Aug. 1)	Coastal Star	0.38	0.52	0.73	48%	100%	100%	100%
	Magenta	0.47	0.90	0.52	100%	43%	54%	100%
	Muir	0.41	0.78	0.52	100%	100%	29%	100%
Succession 2 (Aug. 8-Aug. 29)	Coastal Star	0.09	0.22	0.41	23%	100%	100%	100%
	Magenta	0.30	0.58	0.51	100%	100%	100%	78%
	Muir	0.37	0.68	0.54	100%	100%	54%	75%
Succession 3 (Aug. 25-Sept. 12)	Coastal Star	0.32	0.36	0.89	0%	100%	100%	100%
	Magenta	0.52	0.64	0.82	100%	100%	8%	100%
	Muir	0.33	0.45	0.73	100%	100%	0%	100%
Succession 4 (Sept. 15-Sept. 26)	Coastal Star	0.29	0.69	0.41	0%	100%	100%	100%
	Magenta	0.30	0.60	0.51	100%	27%	87%	100%
	Muir	0.21	0.38	0.55	100%	58%	0%	100%
Means	Succession 1	0.42	0.73	0.59				
	Succession 2	0.25	0.49	0.49				
	Succession 3	0.39	0.48	0.86				
	Succession 4	0.27	0.56	0.53				

By succession and yield category, values with the same letter are not statistically different ( $P \leq 0.10$ ). Where no letters are reported after the numbers, there were no differences among values. For quality measures, percents indicate the percent of quality grading instances (usually during a harvest), where the lettuce was graded Acceptable “A” for a given category.

<sup>b</sup> Plots for Beebout were not harvested by replication, so no statistical analysis was performed.

**Black, Solon (Figure 5, Table 5)**

**Yield**

In the first succession (July 14 harvest) at Black's, Magenta and Muir had statistically higher yield (1.0 lb/ft<sup>2</sup>) than Coastal Star (0.71 lb/ft<sup>2</sup>) (Figure 5), and had larger heads (Table 5). Black did harvest the Coastal Star a week earlier than other varieties, because it was beginning to bolt. In the second succession, Magenta had the highest yield (0.76 lb/ft<sup>2</sup>) (Figure 5), followed by Coastal Star (0.62 lb/ft<sup>2</sup>), then Muir (0.45 lb/ft<sup>2</sup>). Muir also had fewer marketable heads per square-foot during Black's second succession (Table 5). Black noticed some bolting on the Coastal Star, but had some problems with bottom rot on Muir, especially later in the season.

**Quality**

"The biggest challenge was germination," said Black. Photos of seedlings in the second succession show uneven germination. "This didn't happen with any of our other crops," said Black. "Some of the seeds eventually germinated, but with germination happening over a week instead of within a couple days, the seedling size was very uneven. I thought the challenge with summer lettuce would be in tip burn or bolting, but all three varieties withstood the heat really well; the biggest challenge was good germination in the soil blocks. Summer lettuce was the only crop for which we had uneven germination in soil blocks."



**Uneven germination of seedlings at Black's.**

Black also found the summer lettuce to be a little more bitter-tasting and had smaller heads than spring or fall lettuce. "The smaller heads are fine if you're prepared for it; you just need to plant more heads to accommodate the smaller size for CSA or wholesale. We had such good lettuce this summer, due to conducting the trial, that we were able to sell lettuce to restaurants from April to November, only missing one week."

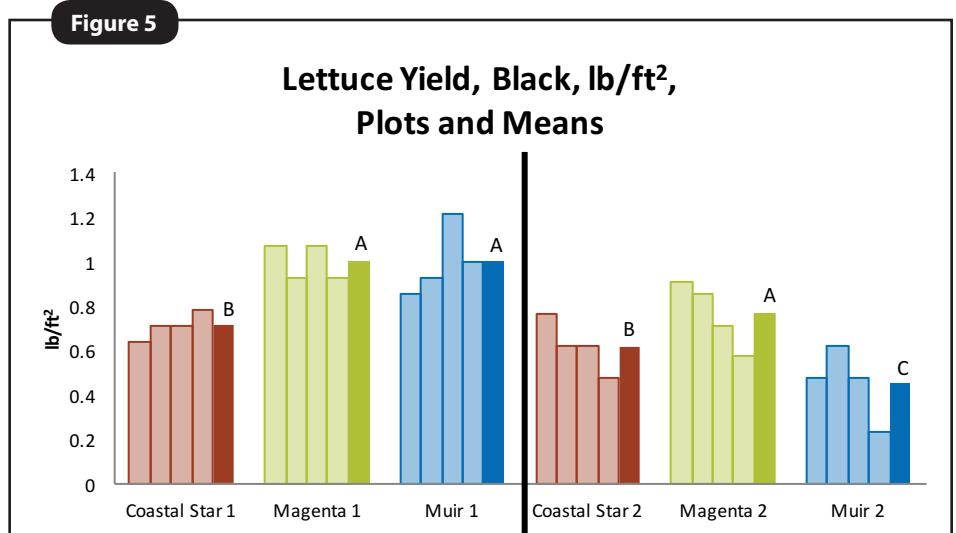


Figure 5: Lettuce yield in lb/ft<sup>2</sup> at Black by variety and succession. Dark bars represent the varietal mean for the succession; light bars are individual plot values. The number next to the varietal name is the succession (Succession 1 on the left side of the figure). By succession, mean bars with the same letter are not statistically different ( $P < 0.10$ ). Where no letters are reported, there were no differences among values.

**Table 5**

**Yield and Quality Characteristics for Summer Lettuce at Black's**

Black	Yield				Quality			
	Variety	Yield (lb/ft <sup>2</sup> )	Head Yield (heads/ft <sup>2</sup> )	Head Weight (lb/head)	"A" Bolting	"A" Tip Burn	"A" Bottom Rot	"A" Flavor
Succession 1 (July 14)	Coastal Star	0.71 b	2.86	0.25 b	75%	100%	100%	100%
	Magenta	1.00 a	2.86	0.35 a	100%	100%	100%	100%
	Muir	1.00 a	2.86	0.35 a	100%	100%	50%	100%
	LSD	0.18	0.00	0.06				
Succession 2 (July 24)	Coastal Star	0.62 b	2.86 a	0.22 b	100%	80%	100%	90%
	Magenta	0.76 a	2.69 a	0.28 a	100%	100%	75%	100%
	Muir	0.45 c	1.79 b	0.25 ab	90%	100%	25%	100%
	LSD	0.12	0.33	0.06				
Means	Succession 1	0.90 a	2.86 a	0.32 a				
	Succession 2	0.61 b	2.44 b	0.25 b				
	LSD	0.13	0.28	0.04				

By succession and yield category, values with the same letter are not statistically different ( $P \leq 0.05$ ). Where no letters are reported after the numbers, there were no differences among values.

Edwards, Iowa City (Figure 6, Table 6)

Yield

Edwards planted two successions of lettuce; yields for each variety by succession are shown in Figure 6. In both successions, Coastal Star had statistically higher yield (0.46 and 0.24 lb/ft<sup>2</sup>) than Magenta (0.25 and 0.15 lb/ft<sup>2</sup>), but was not statistically higher than Muir (0.29 and 0.19 lb/ft<sup>2</sup>). Head yield (heads/ft<sup>2</sup>) were not different by variety, but Coastal Star had larger heads (0.27 lb/head) than the both Magenta (0.18 lb/head) and Muir (0.18 lb/head) in succession 1. Yield components are shown in Table 6.

Edwards irrigated succession 1 six times, totaling 30 hours and 12 min. of irrigation. She irrigated the second succession once, for 12 hours.

Quality

Edwards reported that Coastal Star was prone to bolting in both successions, but was still the top performer for yield. The flavor, was still good, too. Muir was most prone to bottom rot. Edwards preferred the flavor of Magenta to the other varieties.

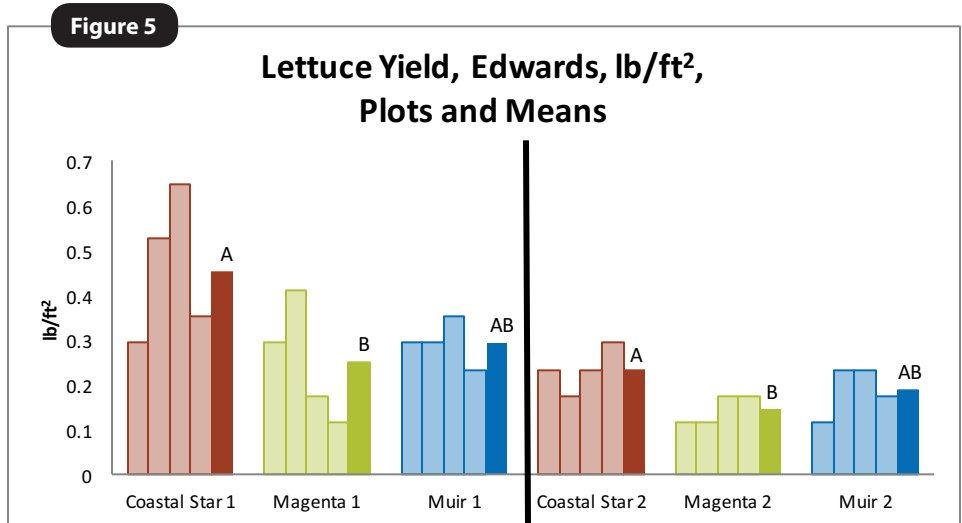


Figure 6: Lettuce yield in lb/ft<sup>2</sup> at Edwards by variety and succession. Dark bars represent the varietal mean for the succession; light bars are individual plot values. The number next to the varietal name is the succession (Succession 1 on the left side of the figure). By succession, bars with the same letter are not statistically different ( $P < 0.10$ ). Where no letters are reported, there were no differences among values.

Table 6

Yield and Quality Characteristics for Summer Lettuce at Edwards's								
Edwards	Yield				Quality			
	Variety	Yield (lb/ft <sup>2</sup> )	Head Yield (heads/ft <sup>2</sup> )	Head Weight (lb/head)	"A" Bolting	"A" Tip Burn	"A" Bottom Rot	"A" Flavor
Succession 1 (July 12)	Coastal Star	0.46 a	1.74	0.27 a	0%	100%	100%	100%
	Magenta	0.25 b	1.32	0.18 b	100%	100%	100%	100%
	Muir	0.29 ab	1.68	0.18 b	100%	100%	50%	100%
	LSD	0.20	0.83	0.08				
Succession 2 (July 19)	Coastal Star	0.24 a	2.24	0.10	0%	75%	75%	100%
	Magenta	0.15 b	1.74	0.08	75%	100%	25%	100%
	Muir	0.19 ab	1.88	0.10	100%	100%	0%	100%
	LSD	0.08	0.54	0.04				
Means	Succession 1	0.33	1.58	0.21				
	Succession 2	0.19	1.95	0.09				

By succession and yield category, values with the same letter are not statistically different ( $P \leq 0.10$ ). Where no letters are reported after the numbers, there were no differences among values.

McGary, Ames (Figure 7, Table 7)

Yield

Coastal Star had the highest yield (0.85 lb/ft<sup>2</sup>) and head weight (1.32 lb/head) of the three varieties at McGary (Table 7 and Figure 7). Magenta and Muir performed quite evenly. McGary had one of the earliest harvest periods of any farmers, which might have worked in favor of Coastal Star, which tended to bolt for other farmers. McGary hand-watered to establish the plants and only once more before the first day of harvest. “These lettuces were planted in an area of our farm with poorer, dryer soil, with less organic matter... it’s possible our lettuce might have grown larger with more irrigation or rain,” she said. “The conditions were quite dry in late June and early July, but the lettuces didn’t seem to be suffering, so we didn’t put down irrigation line or water more.”

McGary had grown Magenta before, but Coastal Star and Muir were new. “We started harvesting the Coastal Star first because of its large size and leaf damage, but maturity days suggest we should have waited longer. We planted some of the extra Muir in another field, and then discovered it got larger than our research plots, so it’s possible that we also harvested the Muir too early in the trial plots.”

Quality

Said McGary, “Overall, these varieties tasted a little bitter but acceptable. They were not sweet and light like spring lettuce. Nothing bolted, perhaps because we were too cautious and harvested too early.” McGary also noted that Muir needed more outer leaves removed at harvest than the other varieties, in line with the observations of other farmers.

Figure 7

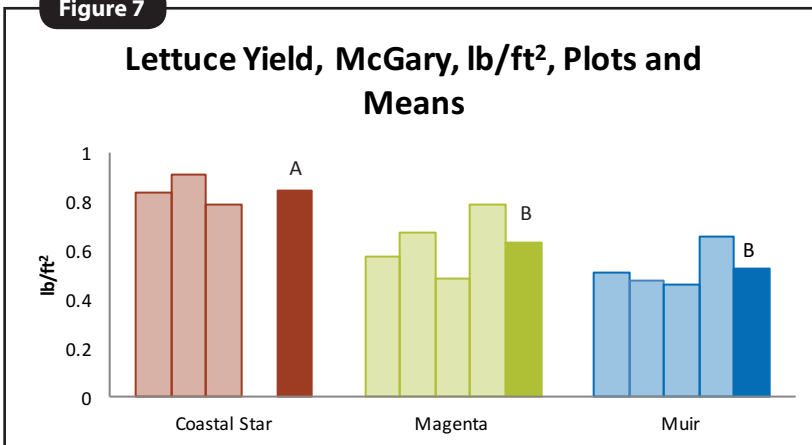


Figure 7: Lettuce yield in lb/ft<sup>2</sup> at McGary by variety. Dark bars represent the varietal mean; light bars are individual plot values. Bars with the same letter are not statistically different ( $P < 0.10$ ). Where no letters are reported, there were no differences among values.

Table 7

Yield and Quality Characteristics for Summer Lettuce at McGary's				
McGary	Yield			
	Variety	Yield (lb/ft <sup>2</sup> )	Head Yield (heads/ft <sup>2</sup> )	Head Weight (lb/head)
Succession 1 (July 4-July 14)	Coastal Star	0.85 a	1.33	1.32 a
	Magenta	0.63 b	1.28	0.97 ab
	Muir	0.53 b	1.26	0.85 b
	LSD	0.20	0.12	0.39
Means	Succession 1	0.65	1.30	1.02

By succession and yield category, values with the same letter are not statistically different ( $P \leq 0.10$ ). Where no letters are reported after the numbers, there were no differences among values.



McGary shows more browning on bottoms of Muir than bottom of Magenta.

Young lettuce at McGary's.



Scheibel, Grinnell (Figure 8, Table 8)

*Yield and Quality*

Scheibel was the only farm that trialed Hampton, and its yield was statistically lower (0.15 lb/ft<sup>2</sup>) than Magenta (0.75 lb/ft<sup>2</sup>) and Muir (0.74 lb/ft<sup>2</sup>) (Figure 8 and Table 8). Hampton yields were lower because of early bolting. More severely, Scheibel's Coastal Star plants bolted in the field and he did not harvest them. Hampton did have statistically larger heads than Magenta and Muir. Scheibel also covered all his lettuce in shade cloth, suspected over low wire hoops. The shade cloth was applied immediately after transplanting and remained until harvest.

**Figure 7**

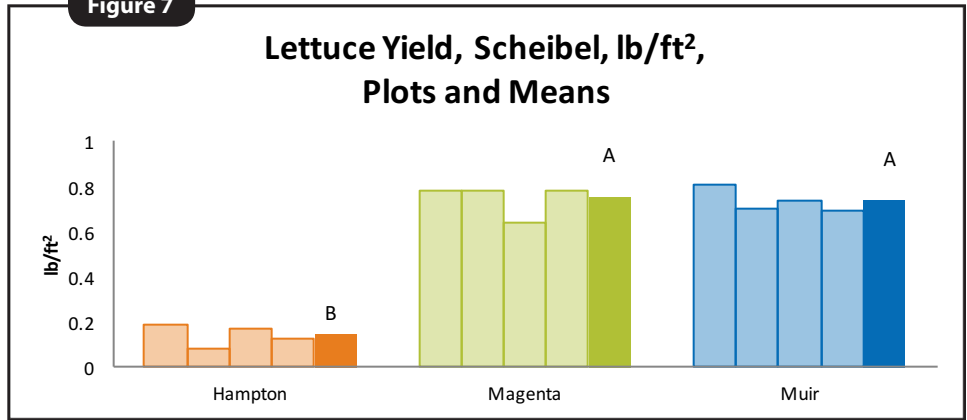


Figure 7: Lettuce yield in lb/ft<sup>2</sup> at McGary by variety. Dark bars represent the varietal mean; light bars are individual plot values. Bars with the same letter are not statistically different ( $P < 0.10$ ). Where no letters are reported, there were no differences among values.

**Table 8**

**Yield and Quality Characteristics for Summer Lettuce at Scheibel's**

Scheibel	Yield				Quality			
	Variety	Yield (lb/ft <sup>2</sup> )	Head Yield (heads/ft <sup>2</sup> )	Head Weight (lb/head)	"A" Bolting	"A" Tip Burn	"A" Bottom Rot	"A" Flavor
Succession 1 (July 24, July 31)	Coastal Star	-	-	-	0%	-	-	-
	Hampton	0.15 a	0.55 a	0.26 a	50%	100%	75%	75%
	Magenta	0.75 b	1.20 b	0.62 b	100%	100%	100%	100%
	Muir	0.74 b	1.20 b	0.61 b	100%	100%	100%	100%
	LSD	0.10	0.18	0.90				
Means	Succession 1	0.54	0.98	0.55				

By succession and yield category, values with the same letter are not statistically different ( $P \leq 0.05$ ). Where no letters are reported after the numbers, there were no differences among values.

Coastal Star was not included in calculation of Scheibel's mean harvest.



First harvest at Scheibel's, July.



Shade cloth over the lettuce trial at Scheibel's.

## Faux, Tripoli (Table 9)

### Yield and Quality

Like Beebout, Faux bulk-harvested lettuce by variety – no statistical analysis could be performed. He did, however, take many observations in the field. His observations line up with some of the other farmers, particularly for quality. Coastal Star provided the highest yield for Faux, but not with the quality he wanted (Table 9). “Coastal Star had very good germination and transplantability, but it started to bolt way too early. The taste wasn’t remarkable and the texture was a bit tough even when the heads were young. For us, it essentially half bolted before they got to the size we wanted.”

Faux thought Muir only “reasonably good.” He said, “Muir had a bad time with poorer germination and weaker plants. We had a large set of these stunt on us at about mid-growth. Again, taste wasn’t remarkable but had very good density. The texture was a little too rough toward the end of the harvest; we also saw some tip burn and bottom rot later in the season.”

Magenta was the standout favorite for Faux, and his customers. He said, “CSA members loved the taste and texture of this lettuce – very nice dense heads. We could not find a hint of bolting in Magenta until late September – we selected a few plants to leave out for 9-10 weeks and they finally gave up and bolted. They also held with good texture and taste longer than many varieties.”

Table 9

Yield and Quality Characteristics for Summer Lettuce at Faux’s

Faux	Yield				Quality			
	Variety	Yield (lb/ft <sup>2</sup> )	Head Yield (heads/ft <sup>2</sup> )	Head Weight (lb/head)	"A" Bolting	"A" Tip Burn	"A" Bottom Rot	"A" Flavor
Succession 1 (Aug. 24 - Sept. 19)	Coastal Star	0.09	0.22	0.39	0%	100%	0%	75%
	Magenta	0.07	0.14	0.51	100%	100%	100%	100%
	Muir	0.05	0.12	0.43	100%	90%	90%	90%
	LSD	-	-	-				
Means	Succession 1	0.07	0.14	0.46				

### Conclusions and Next Steps

Farmers were pleased with the performance of several varieties in this trial, and felt that the heat-tolerant varieties enabled them to grow better lettuce through the summer months. For some farms, Coastal Star performed well, especially early in the summer. Other farmers were dissatisfied with Coastal Star’s tendency to bolt and rougher texture. All farmers liked Magenta, which had the highest yields at three of the six participating farms.

Several farms had issues with germination in their seed trays and soil blocks (all farms transplanted lettuce), and are curious if the pelleted seed – or having to germinate lettuce in hot conditions – might have impacted germination rates and evenness. Beebout set her trial up specifically to germinate seeds during hot weather. Black had uneven germination, and is interested in comparing pelleted and non-pelleted lettuce seed in 2018. McGary also noted that she plans to grow all three varieties next year, but will try to get non-pelleted seed in hopes of better germination. She found Coastal Star to be particularly problematic during germination. Faux thought Muir struggled the most with germination on his farm.

Like McGary, the other farmers plan to continue using these varieties, or at least Magenta, in 2018. Said Faux, “We are continuing to re-dedicate ourselves to providing lettuce to our CSA over a larger percentage of the season. This is consistent with that effort.” He continued, “Lettuce is one of the crops we feel we can scale up production significantly. If we can continue to improve with consistent lettuce production, we are hopeful that we can make consistent bulk sales in the area to support our overall farm success.”

### References

Jett, L.W. 2012. *Evaluating Extended Season Lettuce Production in West Virginia*. West Virginia University Extension. *Midwest Vegetable Trial Report 2012*. [https://ag.purdue.edu/hla/fruitveg/MidWest%20Trial%20Reports/2012/Jett\\_Lettuce.pdf](https://ag.purdue.edu/hla/fruitveg/MidWest%20Trial%20Reports/2012/Jett_Lettuce.pdf)

Johnny's Seeds. 2017. *Salanova: The Ultimate Efficiency Lettuce*. <http://www.johnnyseeds.com/growers-library/vegetables/salanova-marketing-brochure.html?q=salanova> (accessed Dec. 5, 2017).

Iowa Environmental Mesonet. 2017. *Climodat Reports*. Iowa State University, Ames, IA. <http://mesonet.agron.iastate.edu/climodat/> (accessed Aug. 24, 2017).

### PFI Cooperators' Program

PFI's Cooperators' Program gives farmers practical answers to questions they have about on-farm challenges through research, record-keeping, and demonstration projects. The Cooperators' Program began in 1987 with farmers looking to save money through more judicious use of inputs. If you are interested in conducting an on-farm trial contact Stefan Gailans @ 515-232-5661 or [stefan@practicalfarmers.org](mailto:stefan@practicalfarmers.org).