

Season-specific Responses of ‘Medallion’ and ‘Pearl’ to Nitrogen Fertilization

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Summary

- ‘Medallion’ is highly responsive to nitrogen (N) fertilization especially during the early season (through the end of Nov).
- ‘Pearl’ does not require high N fertilization throughout the growing season – similar to Sensation®.
- Low N rates (0.5-1.0 lb/acre/d) are sufficient during the late season for both ‘Medallion’ and ‘Pearl’
- Monitor leaf nutrient status by tissue analysis – optimum N range = 3.0% to 3.5%.

Nitrogen Fertilization

Our previous demonstrated distinctly different N requirements between ‘Medallion’ and ‘Pearl’. ‘Medallion’ was very responsive to N fertilization throughout the season. However, using a high N rate (e.g., 2 lb/acre/d) for 3 to 6 wk during establishment appears to be a more effective fertilization strategy than increasing N rate during the mid to late season. Importantly, increasing N rate has no negative impact on fruit size and Brix for this cultivar. By contrast, ‘Pearl’ is a low N requiring cultivar. Its N requirement is probably even lower than that of Sensation. The objective of this study is to quantify the optimum N rates during early, middle, and late seasons for ‘Medallion’ and ‘Pearl’.

Methods

We evaluated early, mid, and late season N rates in three separate field experiments using ‘Medallion’ and ‘Pearl’ during the 2020-2021 season at the UF/IFAS GCREC in Balm, FL. Tables 1–3 show the N rates in the three experiments. Total N application rates ranged from 105 to 168 lb/acre. All three

experiments were conducted using a split-plot design with N rate as the main plot factor and cultivar as the sub-plot factor with 4 replicates per treatment. Bare-root transplants (Crown Nursery, CA) were planted on Oct 14, 2021. Commercial production and pest management practices were followed. Strawberries were harvested twice a week from November through February.

Table 1. Early-season nitrogen (N) fertilization treatments.

Early-season N rate	Daily N application rate (lb/acre/d)					Total N (lb/acre)
	Oct	Nov	Dec	Jan	Feb	
0.5 lb/acre/d	Sprinkler	0.5	1.0	1.0	1.0	105
1.0 lb/acre/d	Sprinkler	1.0	1.0	1.0	1.0	126
1.5 lb/acre/d	Sprinkler	1.5	1.0	1.0	1.0	147
2.0 lb/acre/d	Sprinkler	2.0	1.0	1.0	1.0	168

↑
Transplanting

Table 2. Mid–late season nitrogen (N) fertilization treatments.

Mid-season N rate	Daily N application rate (lb/acre/d)					Total N (lb/acre)
	Oct	Nov	Dec	Jan	Feb	
0.5 lb/acre/d	Sprinkler	1.0	0.5	1.0	1.0	105
1.0 lb/acre/d	Sprinkler	1.0	1.0	1.0	1.0	126
1.5 lb/acre/d	Sprinkler	1.0	1.5	1.0	1.0	147
2.0 lb/acre/d	Sprinkler	1.0	2.0	1.0	1.0	168

↑
Transplanting

Table 3. Late–late season nitrogen (N) fertilization treatments.

Late-season N rate	Daily N application rate (lb/acre/d)					Total N (lb/acre)
	Oct	Nov	Dec	Jan	Feb	
0.5 lb/acre/d	Sprinkler	1.0	1.0	0.5	1.0	105
1.0 lb/acre/d	Sprinkler	1.0	1.0	1.0	1.0	126
1.5 lb/acre/d	Sprinkler	1.0	1.0	1.5	1.0	147
2.0 lb/acre/d	Sprinkler	1.0	1.0	2.0	1.0	168

↑
Transplanting

Results

Early-season N rate effects on yield

In ‘Medallion’, increasing early-season N rate from 0.5 to 2.0 lb/acre/d increased Nov-Dec, Jan, and total-season yield by 31%, 83%, and 29%, respectively (Table 4). In ‘Pearl’, increasing N rate from 0.5 to 2.0 lb/acre/d increased Nov-Dec and total-season yield by 25% and 8%, respectively (Table 4). For both cultivars, these yield increases were described as significant positive linear responses. These results suggest that ‘Medallion’ is much more responsive to early-season N fertilization than ‘Pearl’ in terms of fruit productivity.

Table 4. Marketable yield of ‘Medallion’ and ‘Pearl’ strawberry as affected by early-season nitrogen (N) rates.

Cultivar	Early-season N rate (lb/acre/d)	Marketable yield (8-lb flat #/acre)			
		Nov-Dec	Jan	Feb	Total
Medallion	0.5	414	446	1,000	1,861
	1.0	485	622	960	2,068
	1.5	465	667	965	2,097
	2.0	541	817	1,045	2,403
	Model fitting	Linear↑	Linear↑	NS	Linear↑
		31%↑	83%↑	--	29%↑
Pearl	0.5	306	542	806	1,653
	1.0	342	539	765	1,646
	1.5	384	430	858	1,673
	2.0	382	493	902	1,778
	Model fitting	Linear↑	NS	NS	Linear↑
		25%↑	--	--	8%↑

NS = non-significant ($P > 0.05$)

Linear↑ = significant positive linear response ($P \leq 0.05$)

Early-season N rate effects on fruit size

In ‘Medallion’, increasing early-season N rate from 0.5 to 2.0 lb/acre/d increased the Nov-Dec, Jan, and total-season average berry size by 14%, 16%, and 9%, respectively (Table 5). These berry size increases were described as significant positive linear responses. In ‘Pearl’, by contrast, increasing early-season N rate did not affect the average berry size throughout the growing season (Table 5). These results suggest that ‘Medallion’ is much more responsive to early-season N fertilization than ‘Pearl’ in terms of fruit size.

Table 5. Average fruit size of ‘Medallion’ and ‘Pearl’ strawberry as affected by early-season nitrogen (N) rates.

Cultivar	Early-season N rate (lb/acre/d)	Average fruit weight (g/berry)			
		Nov-Dec	Jan	Feb	Total
Medallion	0.5	17.7	23.0	26.1	22.9
	1.0	19.3	24.6	24.6	23.1
	1.5	20.0	26.1	26.6	24.6
	2.0	20.2	26.6	27.2	25.0
	Model fitting	Linear↑	Linear↑	NS	Linear↑
		14%↑	16%↑	--	9%↑
Pearl	0.5	15.6	18.8	19.0	18.3
	1.0	14.9	19.5	20.0	18.6
	1.5	16.1	17.8	19.8	18.4
	2.0	16.1	19.1	20.9	19.1
	Model fitting	NS	NS	NS	NS
		--	--	--	--

NS = non-significant ($P > 0.05$)

Linear↑ = significant positive linear response ($P \leq 0.05$)

Mid-season N rate effects on yield

In ‘Medallion’, increasing mid-season N rate from 0.5 to 2.0 lb/acre/d increased Jan and total-season yield by 30% and 26%, respectively (Table 6). In ‘Pearl’, increasing N rate from 0.5 to 2.0 lb/acre/d had no significant effect on monthly yield but increased total-season yield by 13% (Table 6). For both cultivars, these yield increases were described as significant positive linear responses. These results suggest that ‘Medallion’ is much more responsive to mid-season N fertilization than ‘Pearl’ in terms of fruit productivity.

Table 6. Marketable yield of ‘Medallion’ and ‘Pearl’ strawberry as affected by mid-season nitrogen (N) rates.

Cultivar	Mid-season N rate (lb/acre/d)	Marketable yield (8-lb flat #/acre)			
		Nov-Dec	Jan	Feb	Total
Medallion	0.5	381	474	570	1,424
	1.0	457	611	521	1,590
	1.5	435	578	771	1,784
	2.0	441	614	740	1,796
	Model fitting	NS	Linear↑	NS	Linear↑
		--	30%↑	--	26%↑
Pearl	0.5	227	568	617	1,411
	1.0	223	518	736	1,477
	1.5	265	481	669	1,416
	2.0	341	518	741	1,601
	Model fitting	NS	NS	NS	Linear↑
		--	--	--	13%↑

NS = non-significant ($P > 0.05$)

Linear↑ = significant positive linear response ($P \leq 0.05$)

Mid-season N rate effects on fruit size

In 'Medallion', increasing mid-season N rate from 0.5 to 2.0 lb/acre/d increased the Jan, Feb, and total-season average berry size by 12%, 11%, and 12%, respectively (Table 7). These berry size increases were described as significant positive linear responses. In 'Pearl', by contrast, increasing early-season N rate did not affect the average berry size throughout the growing season (Table 5). These results suggest that 'Medallion' is much more responsive to mid-season N fertilization than 'Pearl' in terms of fruit size.

Table 7. Average fruit size of 'Medallion' and 'Pearl' strawberry as affected by mid-season nitrogen (N) rates.

Cultivar	Mid-season N rate (lb/acre/d)	Average fruit weight (g/berry)			
		Nov-Dec	Jan	Feb	Total
Medallion	0.5	17.7	25.1	23.2	21.5
	1.0	19.1	26.8	23.4	23.0
	1.5	20.0	26.7	25.6	24.3
	2.0	18.5	28.0	25.9	24.2
	Model fitting	NS	Linear↑	Linear↑	Linear↑
		--	12%↑	11%↑	12%↑
Pearl	0.5	18.0	20.8	19.9	19.9
	1.0	16.5	19.9	19.9	19.2
	1.5	16.6	20.2	19.2	18.9
	2.0	17.4	20.2	19.8	19.3
	Model fitting	NS	NS	NS	NS
		--	--	--	--

NS = non-significant ($P > 0.05$)

Linear↑ = significant positive linear response ($P \leq 0.05$)

Late-season N rate effects on yield and fruit size

For both cultivars, increasing late-season N rate had no significant effect on yield and fruit size.

Table 8. Marketable yield of 'Medallion' and 'Pearl' strawberry as affected by late-season nitrogen (N) rates.

Cultivar	Late-season N rate (lb/acre/d)	Marketable yield (8-lb flat #/acre)			
		Nov-Dec	Jan	Feb	Total
Medallion	0.5	378	607	690	1,676
	1.0	412	592	699	1,703
	1.5	406	561	603	1,569
	2.0	400	519	646	1,565
	Model fitting	NS	NS	NS	NS
		--	--	--	--
Pearl	0.5	338	479	616	1,434
	1.0	270	489	609	1,368
	1.5	308	416	676	1,401
	2.0	370	541	458	1,369
	Model fitting	NS	NS	NS	NS
		--	--	--	--

NS = non-significant ($P > 0.05$)

Table 9. Average fruit size of 'Medallion' and 'Pearl' strawberry as affected by late-season nitrogen (N) rates.

Cultivar	Late-season N rate (lb/acre/d)	Average fruit weight (g/berry)			
		Nov-Dec	Jan	Feb	Total
Medallion	0.5	17.6	24.9	26.0	23.1
	1.0	17.4	25.0	25.5	22.8
	1.5	16.0	25.4	25.5	22.2
	2.0	17.3	25.5	25.4	22.8
	Model fitting	NS	NS	NS	NS
		--	--	--	--
Pearl	0.5	13.7	20.2	19.2	18.0
	1.0	14.4	18.8	21.4	18.8
	1.5	14.1	18.9	18.6	17.8
	2.0	14.7	20.0	18.7	17.8
	Model fitting	NS	NS	NS	NS
		--	--	--	--

NS = non-significant ($P > 0.05$)

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