# Optimization of Potassium Fertilization Rate for Florida Strawberry Cultivars (Year 1)

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## Summary

**We evaluated five potash ($K_2O$) rates from 0 to 4 lb/acre/d during early (Wk 3–8), middle (Wk 9–14), and late (Wk 15–20) seasons for four cultivars, Brilliance, Medallion, Ember and Encore. The effectiveness of $K_2O$ fertilization was negligible, high, and moderate during the early, mid-, and late seasons, respectively. This pattern contrasts with the yield response to nitrogen but is consistent with the higher $K_2O$ demand for fruit production than for vegetative growth. Furthermore, cultivar-specific responses were evident, with yield response to $K_2O$ ranked as follows: Brilliance > Ember = Encor > Medallion. This study will be repeated for one or two additional seasons, and the compiled data will be used to update the current $K_2O$ recommendation.**


## Potassium Fertilization

Potassium (K), one of the three primary macronutrients along with nitrogen and phosphorus, plays vital roles in plant development and physiology, including nutrient transport, stomatal regulation, stress tolerance, osmotic balance, and enzyme activation. In strawberries, K is especially important for fruit quality. Adequate K enhances berry size and the accumulation of sugars, organic acids, vitamins, and antioxidants, improving flavor, color, aroma, and nutritional value. Optimizing K fertilization can improve yield and quality, whereas excessive application may reduce profitability and cause soil nutrient imbalance, water contamination, or salinization.

While our previous research has largely focused on nitrogen management, leading to the revision of nitrogen fertilization guidelines in 2023, limited work has addressed K fertilization in Florida strawberries. The current recommendation for $K_2O$ is 0.6 to 0.8 lb/acre/d throughout the season, with a maximum total application rate of 150 lb/acre, and it has not been updated in more than a decade.

## Methods

We evaluated early, mid, and late season $K_2O$ rates in three separate field experiments during the 2024–25 season at the UF/IFAS GCREC in Balm, FL. **Tables 1–3** show the $K_2O$ rates evaluated in each experiment. We tested five $K_2O$ rates from **0 to 4 lb/acre/d during early (Wk 3–8), middle (Wk 9–14), and late (Wk 15–20) seasons** for four cultivars, **Brilliance, Medallion, Ember and Encore**. Total $K_2O$ application rates ranged from 84 to 252 lb/acre. All three experiments were conducted using a split-plot design with $K_2O$ 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 15, 2024. Commercial production and pest management practices were followed. Strawberries were harvested weekly from Nov through Feb.

**Table 1.** Early-season $K_2O$ fertilization treatments.

| # | | Daily $K_2O$ application rate (lb/acre/d) | | | | | Total $K_2O$ (lb/acre) |
|---|---|---|---|---|---|---|---|
| | | Oct | Nov | Dec | Jan | Feb | |
| 1 | Sprinkler | 0.0 | | 1.0 | | 1.0 | **84** |
| 2 | | 1.0 | | 1.0 | | 1.0 | **126** |
| 3 | | 2.0 | | 1.0 | | 1.0 | **168** |
| 4 | | 3.0 | | 1.0 | | 1.0 | **210** |
| 5 | | 4.0 | | 1.0 | | 1.0 | **252** |

Transplanting date = Oct 15, 2024
Wk 1–2 = sprinkler irrigation, no fertigation (10/15–10/28)
**Wk 3–8 (6 wk) = early season (10/29–12/9)**
Wk 9–14 (6 wk) = mid-season (12/10–1/20)
Wk 15–20 (6 wk) = late season (1/21–3/3)

**Table 2.** Mid–late season $K_2O$ fertilization treatments.

| # | | Daily $K_2O$ application rate (lb/acre/d) | | | | | Total $K_2O$ (lb/acre) |
|---|---|---|---|---|---|---|---|
| | | Oct | Nov | Dec | Jan | Feb | |
| 1 | Sprinkler | 1.0 | | 0.0 | | 1.0 | 84 |
| 2 | | 1.0 | | 1.0 | | 1.0 | 126 |
| 3 | | 1.0 | | 2.0 | | 1.0 | 168 |
| 4 | | 1.0 | | 3.0 | | 1.0 | 210 |
| 5 | | 1.0 | | 4.0 | | 1.0 | 252 |

Transplanting date = Oct 15, 2024
Wk 1–2 = sprinkler irrigation, no fertigation (10/15–10/28)
Wk 3–8 (6 wk) = early season (10/29–12/9)
**Wk 9–14 (6 wk) = mid-season (12/10–1/20)**
Wk 15–20 (6 wk) = late season (1/21–3/3)

**Table 3.** Late–late season $K_2O$ fertilization treatments.

| # | | Daily $K_2O$ application rate (lb/acre/d) | | | | | Total $K_2O$ (lb/acre) |
|---|---|---|---|---|---|---|---|
| | | Oct | Nov | Dec | Jan | Feb | |
| 1 | Sprinkler | 1.0 | | 1.0 | | 0.0 | 84 |
| 2 | | 1.0 | | 1.0 | | 1.0 | 126 |
| 3 | | 1.0 | | 1.0 | | 2.0 | 168 |
| 4 | | 1.0 | | 1.0 | | 3.0 | 210 |
| 5 | | 1.0 | | 1.0 | | 4.0 | 252 |

Transplanting date = Oct 15, 2024
Wk 1–2 = sprinkler irrigation, no fertigation (10/15–10/28)
Wk 3–8 (6 wk) = early season (10/29–12/9)
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**Wk 15–20 (6 wk) = late season (1/21–3/3)**

## Results

### Early-season $K_2O$ rate effects (Figs. 1–2)

In all four tested cultivars, neither canopy growth, yield, nor fruit size (data not shown) was significantly affected by early-season $K_2O$ rates.

Brix responses were dependent on cultivar and harvest time. During the early harvest (12/17), Brilliance showed a 0.7–0.9° increase in Brix with increasing $K_2O$ rate from 0 to 1–4 lb/acre/day, whereas other cultivars exhibited minimal responses (data not shown). No significant differences in Brix were observed during the mid- or late-season harvests.

### Mid-season $K_2O$ rate effects (Fig. 3)

In all four tested cultivars, canopy growth was not significantly affected by mid-season $K_2O$ rates (data not shown). Although increasing mid-season $K_2O$ rates from 0 to 4 lb/acre/d had no significant effect on marketable yield from November to January, it increased Feb–Mar yield linearly for all cultivars except Medallion. The maximum yield increases during this period were 42% in Brilliance, 43% in Ember, and 31% in Encor. Increases in total seasonal yield with increasing $K_2O$ rates from 0 to 4 lb/acre/day were 26% in Brilliance, 16% in Medallion, and 18% in Ember and Encor, but these differences were not statistically significant at the 5% probability level. In all cultivars, neither fruit size nor Fruit Brix was affected by mid-season $K_2O$ rates throughout the harvest period (data not shown).

### Late-season $K_2O$ rate effects (Fig. 4)

In all four tested cultivars, canopy growth was not significantly affected by late-season $K_2O$ rates (data not shown). As expected, yield was largely unaffected during the early harvest period (Nov–Jan), since the late-season $K_2O$ treatment began in late January. From February to March, Brilliance increased yield linearly with late-season $K_2O$ rates, with a maximum increase of 42%, resulting in a 13% increase in total season yield. Other cultivars showed no significant yield response. In all cultivars, neither fruit size nor fruit Brix was affected by late-season $K_2O$ rates throughout the harvest period (data not shown).

## Takeaways

- Plants are more responsive to K applied during the **mid- and late-growth stages** (vegetative growth requires more N, whereas fruit growth requires more K).
- Yield response to K rate: **Brilliance > Ember = Encor > Medallion.**
- K fertilization had **minimal effects on fruit size and Brix**.
- K rates should be kept **low until K demand increases for fruit production**.
- Growth stage-specific K recommendations will require data from additional seasons.

## Contact

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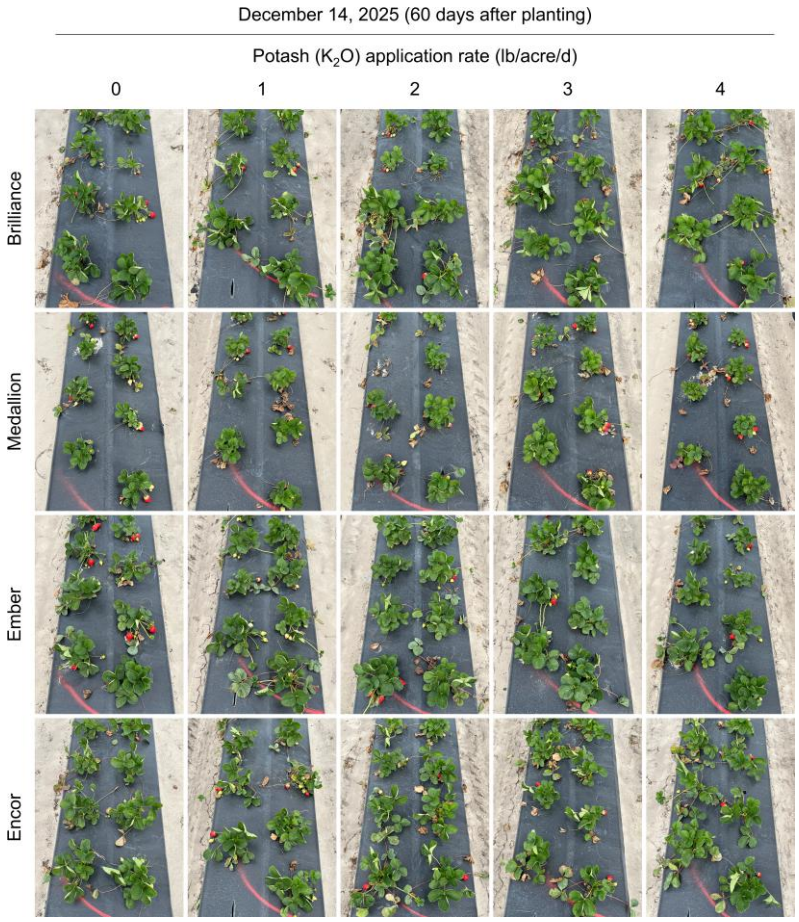


**Figure 1.** Canopy growth of four strawberry cultivars as affected by early season potassium ($K_2O$) rates.

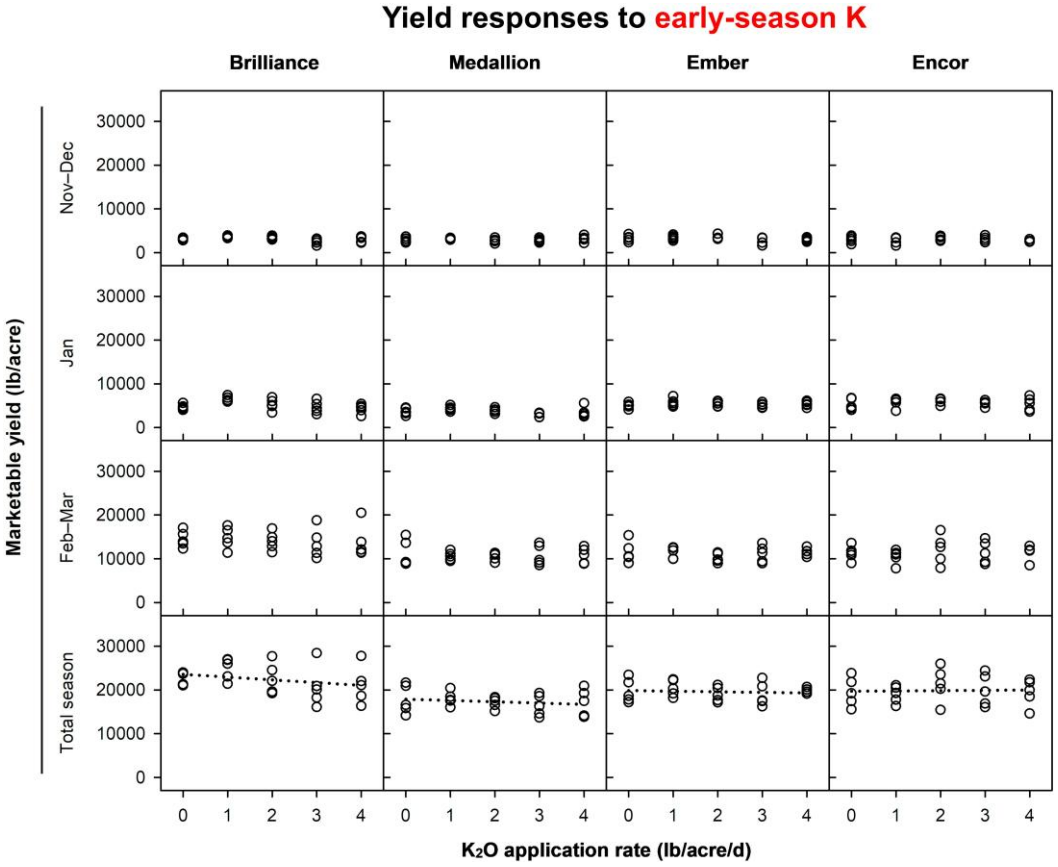


**Figure 2.** Marketable yield of four strawberry cultivars as affected by early-season potash ($K_2O$) rates.

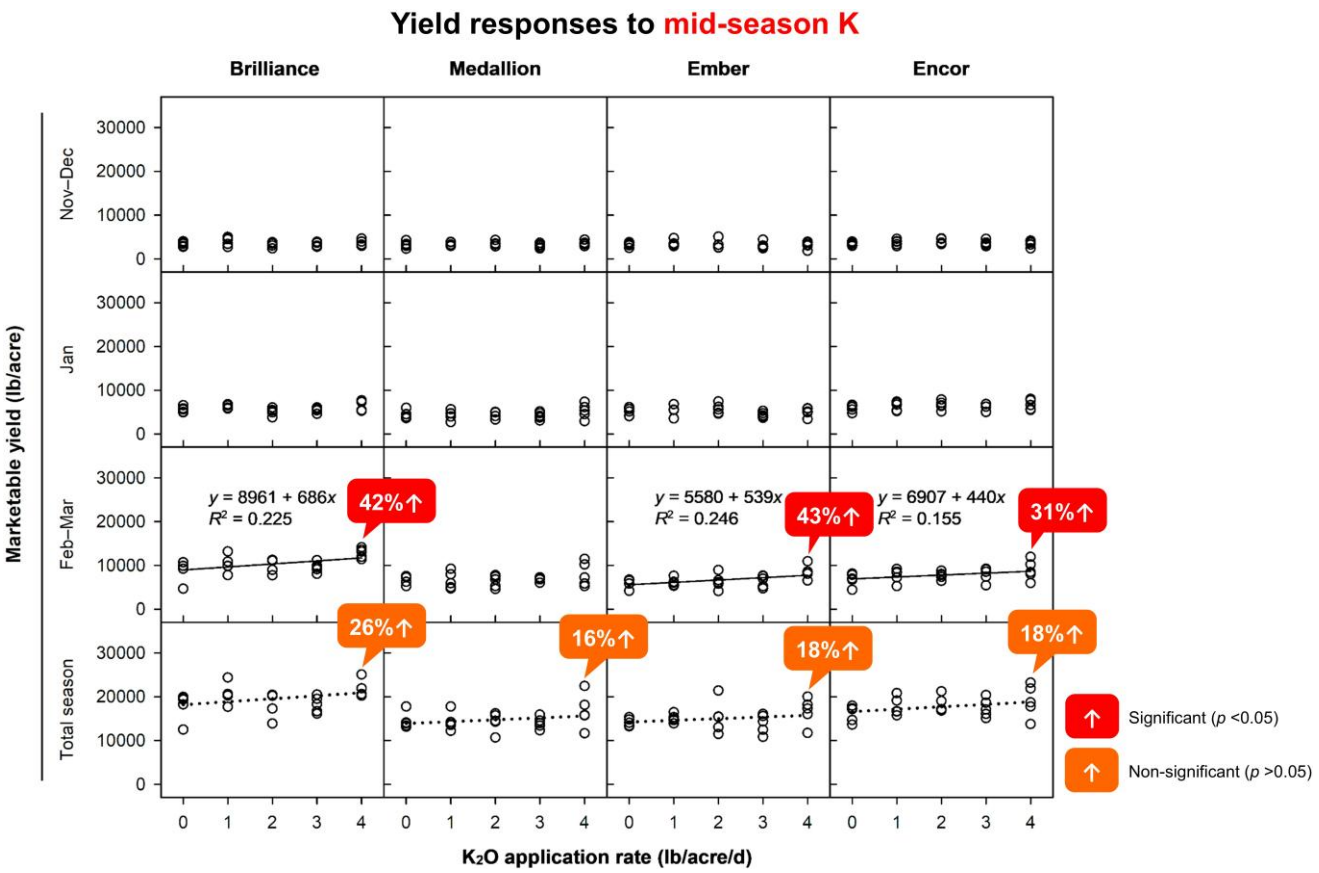


**Figure 3.** Marketable yield of four strawberry cultivars as affected by mid-season potash ($K_2O$) rates.

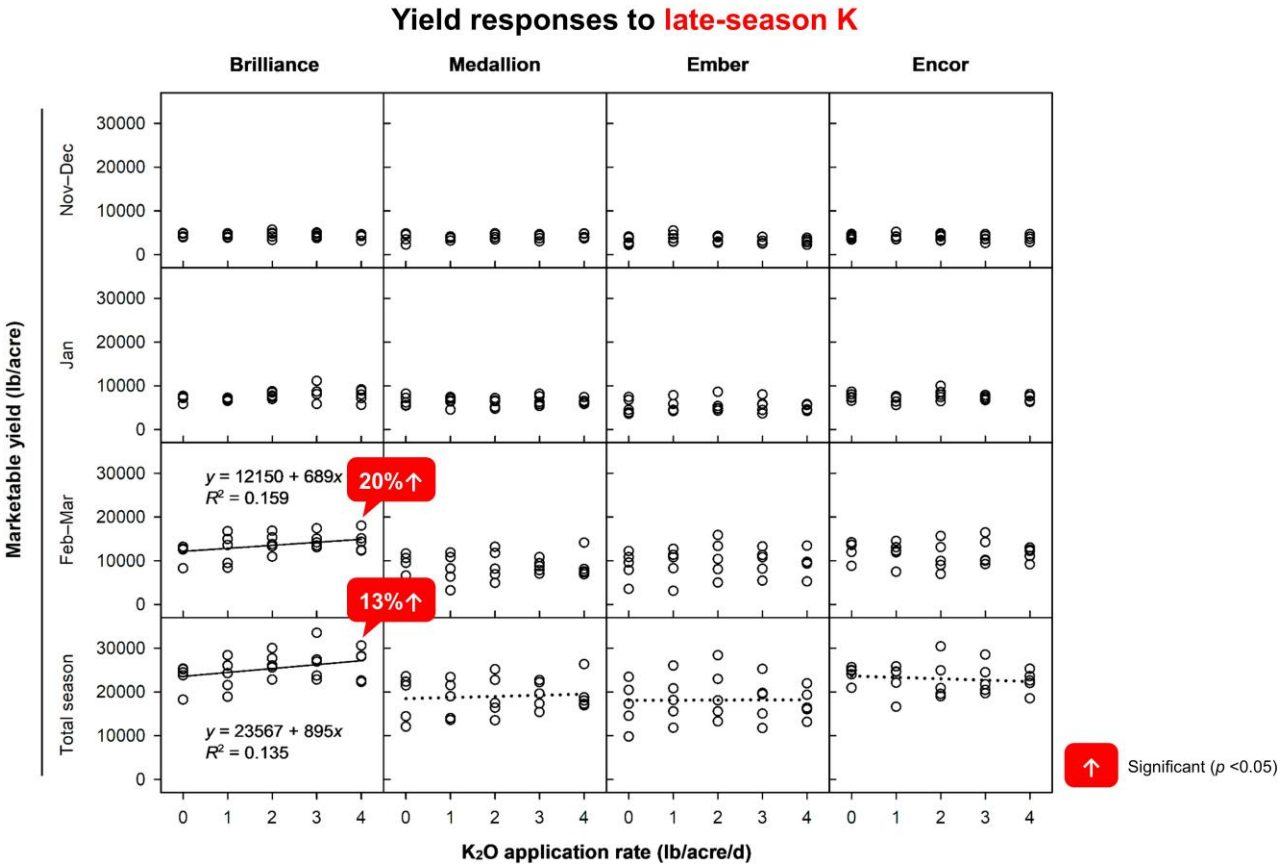


**Figure 4.** Marketable yield of four strawberry cultivars as affected by late-season potash ($K_2O$) rates.