

# Fully-metalized and Metalized-stripe Plastic Mulch Films Increase Strawberry Yields of Bare-root and Plug Transplants

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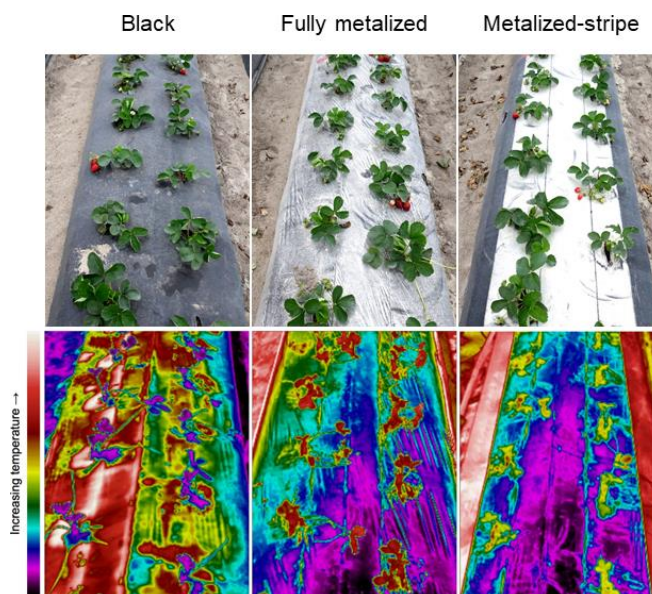
## Summary

The plastic mulch experiment conducted on bare-root and plug strawberry transplants in the previous season was repeated, and similar results were obtained. Fully-metalized and metallized-stripe mulch films increased early (Nov-Dec) and total (Nov-Mar) yields by up to 50% and 17%, respectively. The magnitude of yield increases was greater for ‘Florida Radiance’ and Sensation® than for ‘Florida Brilliance’, but was similar between bare-root and plug transplants. Based on the results of the 2018-2019 and 2019-2020 seasons, we highly recommend trying reflective mulch films, especially when planting strawberries before Oct 10. The major drawbacks of metalized films were the fading of aluminum coatings by high pH sprinkler water (pH >7.5) and the stiff texture. If these are concerns, we recommend trying white-on-black mulch, which should perform better than black mulch and nearly as well as metalized mulch films.

## Fully metalized and metallized-stripe plastic mulch films

Plastic mulch films tested during the 2019-2020 season are shown in Fig. 1. Thermographic images demonstrate the reflective properties and the resulting cooling effects of the two metalized mulch films. Metalized-stripe mulch has a 20” wide aluminum center stripe and black shoulders. Compared to black mulch, reflective mulch films can reduce soil and mulch surface temperatures by reflecting a greater proportion of incoming solar radiation. Reflective mulch films can improve

establishment and early fruit production of bare-root transplants particularly when planted before October 10. Previous field trials at GCREC showed significant early-season yield increases of up to 70% with reflective mulch films. Other beneficial effects of reflective mulch films include reduced damage from Phytophthora crown rot, total season yield increases, and fruit size increases. In this trial, we evaluated reflective mulch films on both bare-root and plug transplants of major strawberry cultivars in Florida.



**Figure 1.** Cooling effects of fully metalized and metalized stripe mulch films compared to black plastic mulch.

## Methods

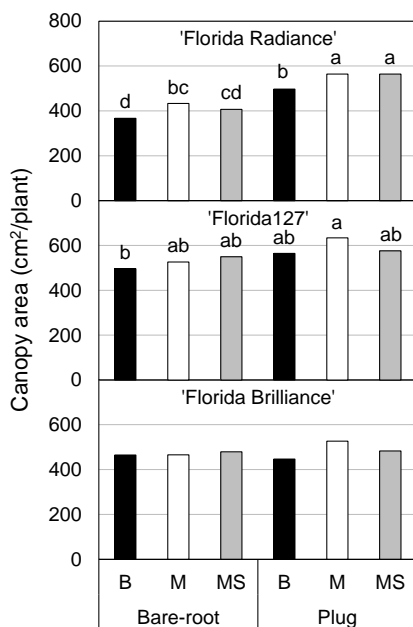
Three types of plastic mulch films, black, fully-metalized, and metalized-stripe (Fig. 1), were evaluated using bare-root and plug transplants of

'Florida Radiance', Sensation® 'Florida 127', and 'Florida Brilliance' at GCREC. All tested plastic mulch films were manufactured by IMAFLEX Inc. (Qubec, Canada). Transplants were planted in the field on Oct 2, 2019. Each treatment had four replicate plots with 16 plants per plot. The plots were arranged in a split-split plot design, with plastic mulch films, transplant types, and cultivars assigned to main plots, sub-plots, and sub-subplots, respectively. Plants were harvested 27 times between Nov 13, 2019 and Mar 6, 2020. Commercial standard fertilization, irrigation, and pest management were used.

## Results

### Canopy growth

There was an increasing trend in the early plant canopy development with the reflected mulch films. Compared to black mulch, the reflected mulch films increased canopy area during the early fruiting stage by 11%-18%, 2%-11%, and 0%-18% in 'Florida Radiance', Sensation®, and 'Florida Brilliance' (Fig. 2). These increases were statistically significant in 'Florida Radiance'.



**Figure 2.** Canopy area of three strawberry cultivars as affected by transplant type and plastic mulch. Data were collected on Nov 27, 2019 (56 days after transplanting). B = black mulch; M = metalized mulch; MS = metalized-stripe mulch. Bars followed by the same letter are not significantly different at  $P < 0.1$  (Tukey-Kramer test).

### Yield

The reflective mulch films increased Nov-Dec and Jan-Mar yields by 16%-35% and 11%-17% in 'Florida

Radiance', by 4%-50% and 9%-16% in Sensation®, and by 8%-18% and 6%-11% in 'Florida Brilliance' (Tables 1-3). Overall, yield appears to be more responsive to the reflective mulch films during the early season than during the late season. The magnitude of yield increases was greater for 'Florida Radiance' and Sensation® than for 'Florida Brilliance', but it was similar between bare-root and plug transplants. The results suggest that both reflective mulch films are equally effective in improving early yield, particularly for 'Florida Radiance' and Sensation®. Heat stress mitigation by the reflective mulch films is beneficial to both bare-root and plug transplants.

**Table 1.** Marketable yield of 'Florida Radiance' strawberry as affected by transplant type and plastic mulch.

Transplant type	Plastic mulch	Marketable yield (lb/acre)		
		Nov-Dec	Jan-Mar	Total
Bare-root	Black	2,209	9,442	11,651
	Metalized	2,554 (16%↑)	10,675 (13%↑)	13,229 (14%↑)
	Metalized-stripe	2,653 (20%↑)	10,287 (9%↑)	12,940 (11%↑)
Plug	Black	2,261	8,945	11,206
	Metalized	3,050 (35%↑)	9,766 (9%↑)	12,816 (14%↑)
	Metalized-stripe	2,812 (24%↑)	10,320 (15%↑)	13,131 (17%↑)

**Table 2.** Marketable yield of Sensation® 'Florida127' strawberry as affected by transplant type and plastic mulch.

Transplant type	Plastic mulch	Marketable yield (lb/acre)		
		Nov-Dec	Jan-Mar	Total
Bare-root	Black	2,670	9,405	12,074
	Metalized	3,804 (42%↑)	10,067 (7%↑)	13,871 (15%↑)
	Metalized-stripe	3,497 (31%↑)	9,657 (3%↑)	13,154 (9%↑)
Plug	Black	2,954	11,197	14,151
	Metalized	4,430 (50%↑)	11,606 (4%↑)	16,035 (13%↑)
	Metalized-stripe	3,060 (4%↑)	13,328 (19%↑)	16,388 (16%↑)

**Table 3.** Marketable yield of 'Florida Brilliance' strawberry as affected by transplant type and plastic mulch.

Transplant type	Plastic mulch	Marketable yield (lb/acre)		
		Nov-Dec	Jan-Mar	Total
Bare-root	Black	4,076	8,161	12,237
	Metalized	4,824 (18%↑)	8,170 (0%↑)	12,995 (6%↑)
	Metalized-stripe	4,391 (8%↑)	8,727 (7%↑)	13,118 (7%↑)
Plug	Black	3,853	10,841	14,694
	Metalized	4,521 (17%↑)	11,675 (8%↑)	16,196 (10%↑)
	Metalized-stripe	4,165 (8%↑)	12,099 (12%↑)	16,264 (11%↑)

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