

## White-striped Mulch to Improve Early Yield

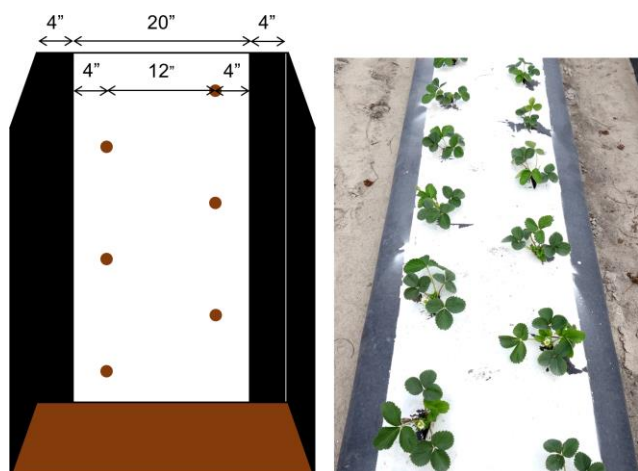
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### Summary

White-striped plastic mulch can reduce bed-center soil temperature by 7.4 °F in October, while warming the soil at the bed shoulders during cooler months to the same extent as black mulch. This optimization of soil microenvironments has several beneficial effects on strawberry production in Florida, including increased early-season and total yields, suppressed thrip damage and “bullet” shape fruit development, and reduced runner growth.

### White-striped mulch

White-striped plastic mulch tested during the 2016-2017 season is shown in Fig. 1. The 20”-wide white stripe was painted using an acrylic-based spray paint. It is expected that the white center stripe will cool the soil surface and root-zone during the establishment period, while the black shoulders will warm the soil during cooler months. Therefore, the main purpose of this plastic mulch is to minimize heat stress during the establishment period and improve early yield.



**Figure 1.** White-striped plastic mulch tested during the 2016-2017 strawberry season.

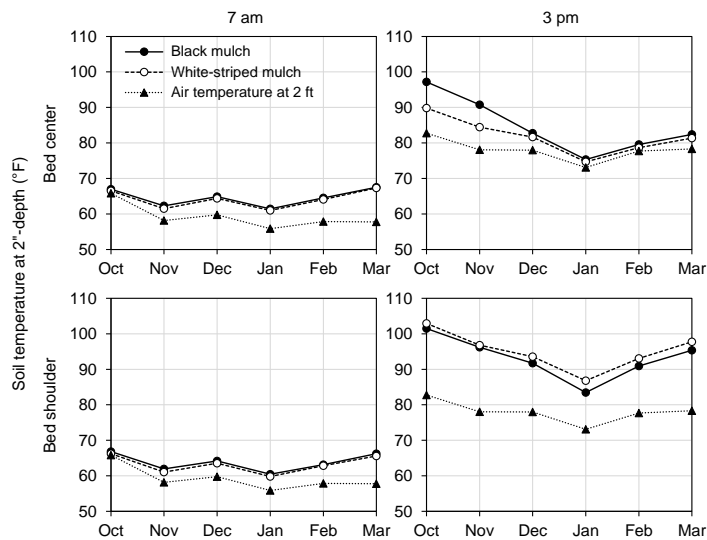
### Methods

Two types of plastic mulch (entirely black mulch and white-striped mulch) were evaluated using three cultivars (‘Florida Beauty’, ‘Florida Radiance’ and FL 13.26-134) at GCREC. Bare-root transplants were transplanted on September 29 and October 14, 2016. Each treatment had four replicated plots with 14 plants per plot. The plots were arranged in a split-plot design with plastic mulch type as a main-plot factor and cultivar as a sub-plot factor. Harvests were performed 32 times between November 15, 2016 and March 6, 2017.

### Results

#### Bed center vs. bed shoulder soil temperatures

Soil temperature was generally lowest at 7 am and highest at 3 pm throughout the growing season (Fig. 2). At 7 am, soil temperature was similar regardless of bed position and plastic mulch type, at 59.8-67.5 °F over the season. At 3 pm, by contrast, soil temperature was significantly affected by both bed position and plastic mulch type. Compared to black mulch, white-striped mulch reduced the bed center soil temperature by 7.4 °F in October and by 6.3 °F in November, whereas it maintained the same soil temperature in the bed shoulder throughout the season. These results suggest that white-striped mulch optimized soil environments by reducing heat loads during establishment, while maintaining the same soil warming effects at the bed shoulder as black mulch.



**Figure 2.** Monthly air temperature and soil temperature recorded at 7 am and 3 pm in the bed center and bed shoulder as affected by black mulch and white-striped mulch.

### Yield

Compared to black mulch, white-striped mulch increased total marketable yield of ‘Florida Radiance’ in both plantings by 18% to 28%, whereas it increased total marketable yield of other two cultivars only for the late planting by 12% to 14%. Because both ‘Florida Beauty’ and ‘FL 13.26-134’ have improved earliness, white-striped mulch may have limited beneficial effects on these cultivars. By contrast, optimization of soil microenvironments by white-striped mulch has significant beneficial effects for ‘Florida Radiance’, which is relatively more sensitive to heat stress during establishment. For this cultivar, yield increases by white-striped mulch are most pronounced from November to January, during which market prices are favorable. Yield increases by white-striped mulch are due mainly to increased fruit set but due partly to suppressed thrip damage and “bullet” shaped fruit development. Another beneficial effect of white-striped mulch was reduced runner growth in November and December.

**Table 1.** Strawberry yield of three cultivars planted on Sep. 29 and Oct. 14, 2016 on black mulch and white-striped mulch beds.

Planting date	Cultivar	Plastic mulch	Yield (8-lb flat/acre)		
			Nov-Jan	Feb-Mar	Total
Sep. 29	Florida Radiance	Black	902	1679	<b>2581</b>
		White-striped	1311	1993	<b>3304</b>
			(45%↗)	(19%↗)	<b>(28%↗)</b>
	Florida Beauty	Black	1256	1592	<b>2847</b>
		White-striped	1150	1531	<b>2681</b>
			(8%↘)	(4%↘)	<b>(6%↘)</b>
FL13.26-134	Black	1620	2164	<b>3783</b>	
	White-striped	1612	2352	<b>3963</b>	
		(0%↘)	(9%↘)	<b>(5%↗)</b>	
Oct. 14	Florida Radiance	Black	995	1511	<b>2506</b>
		White-striped	1247	1708	<b>2956</b>
			(25%↗)	(13%↗)	<b>(18%↗)</b>
	Florida Beauty	Black	920	1243	<b>2163</b>
		White-striped	1033	1393	<b>2426</b>
			(12%↗)	(12%↗)	<b>(12%↗)</b>
FL13.26-134	Black	1120	1519	<b>2640</b>	
	White-striped	1370	1629	<b>2998</b>	
		(22%↗)	(7%↗)	<b>(14%↗)</b>	

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