

Rowcovers for 'Sparkle' Strawberries

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This paper reports on the use of clear polyethylene as a rowcover for strawberries to enhance early ripening.

Dormant, virus-indexed 'Sparkle' strawberry (*Fragaria × ananassa* Duchesn.) plants were set in single-row, 4.6-m plots 38 cm apart in rows 90 cm apart in a Narragansett silt loam (coarse-loamy, mixed, mesic Typic Dystrachrepts) in Rhode Island. Four runner plants were allowed to develop on each plant set, two on each side of a row, giving a triple-row system. The runner plants were ≈ 18 cm diagonally from the mother plant.

The effects of 0.13-mm-thick clear polyethylene covers on the time of ripening, yield, and fruit weight of 'Sparkle' strawberries was studied by varying the time of application and removal. To initiate more flower buds for two treatments, plants were covered in the fall (5 Oct. 1958) before air temperature 7.5 cm above the ground surface reached 0C. All polyethylene rowcovers were supported by 8-gauge (3.3 mm in diameter) wire hoops that were spaced at intervals of ≈ 1.0 m above the plants. The sides were held down with strips of furring stapled to them. The ends of the rowcovers were held in place with rocks. There were four treatments: 1) fall-winter (FWC), removal of rowcover in early spring (26 Mar.); 2) fall-winter-spring (FWSC), removal 22 May; 3) winter-spring (WSC), a set of polyethylene rowcovers was placed over the plants on 3 Dec. after 21 days of minima below 0C and removed 22 May; 4) uncovered plants (NC). There were four replications in a randomized block design using minimums of 20 plants/plot.

Fruit was harvested, graded, and weighed every 3 to 4 days, beginning 22 May and continuing until 16 July. Fruit grades were: large (> 8.0 g), marketable (4.0 to 7.9 g), undersize (2.0 to 3.9 g), and culls (< 2.0 g and/or malformed).

All plants were maintained as mother and a set of four daughter plants. Additional runners were removed and counted on three dates.

Time of covering and removal of rowcover significantly affected fruit count and

yield of 'Sparkle' strawberries (Table 1). The FWSC produced the largest total number of fruit, but 19% of the fruit was unmarketable. The WSC produced less total fruit than FWSC and 20% of the fruit was unmarketable. The high percentage of nonmarketable fruit could be due to: 1) heat injury to some of the stamens and/or pistils causing partially sterile flowers to develop into malformed fruit, and 2) some of the flowers not being adequately pollinated since the plants were under rowcovers during full bloom. Individual fruit size is inversely proportional to phototemperature (Went, 1957), and higher temperatures under the rowcovers caused early fruit maturity and reduced individual fruit weight (Table 1). It has been reported that rowcovers reduced air movement and modified midwinter minimum soil temperatures (Pritts et al., 1989). In March, temperature under the rowcover was as much as 4.5C higher than that at the same level, 7.5 cm above the ground, in the uncovered plot.

There was no significant difference in total fruit count between the FWSC and FWC (Table 1), but the latter had much less nonmarketable fruit (7%). Perhaps the fall rowcovers prolonged growth so that the plants initiated more flower buds. However, it has been reported that there was no benefit from applying rowcovers in New York before mid-November (Pritts et al., 1989). There was no significant difference in total fruit count between FWC and WSC treatments. Since plants under spring rowcovers began to grow earlier in the season, perhaps the short days and cool evening temperatures initiated more flower buds during this time. 'Sparkle' requires a daylength of 11 to 13 h (Austin et al., 1961), with night at 21C for maximum flower bud initiation (Gosselink, 1959); therefore, it is possible that the spring rowcover helped initiate more flower buds in

addition to those produced with fall rowcovers, or there was no fall flower initiation.

The FWC and FWSC led to the largest yields of marketable fruit (Table 1). This result is attributed to the production of more marketable and heavier fruit by plants that remained under rowcovers during the spring.

Plants under WSC produced more runners than plants under FWC (Table 1). Microclimate under FWC was favorable for flower bud initiation over a longer period in the fall, and a greater proportion of the axillary buds in the leaf axils may have developed into fruit buds. In earlier studies, increases in temperature increased runner production (Went, 1957), and low temperatures promoted fruit bud formation (Darrow, 1936; Hartmann, 1947; Went, 1957).

In conclusion, the FWSC probably caused additional flower bud initiation in the fall; FWC also initiated additional flowers in the fall, but some could have aborted in the very early spring; and the WSC provided winter protection. By using the FWSC and FWC, it is possible to obtain a marketable yield for 5 weeks compared to 3 weeks for open rows. Rowcovers in the spring should be ventilated during the day, but closed at night.

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Table 1. Effect of clear polyethylene rowcovers on fruit weight, yield, and number of runners on unmulched 'Sparkle' strawberry plants.

Duration of rowcover	Total no. fruit/plant	Marketable		Avg fruit wt (g)	Culls		Avg no. runners/plant
		No./plant	Wt/plant (g)		No. fruit/plant	Percentage of total	
No cover	11.7 c ^z	11.4 c	73 c	6.4 a	0.3 b	2.6	10.0 ab
Fall-winter	33.3 ab	31.0 a	182 a	5.9 a	2.3 b	6.9	7.1 b
Fall-winter-spring	37.1 a	30.1 a	138 ab	4.6 b	7.0 a	18.9	10.8 ab
Winter-spring	25.4 b	20.4 b	101 b	5.0 b	5.0 a	19.7	14.3 a

^zMeans within a column followed by the same letter are not significantly different (P < 0.05) by Duncan's multiple range test.

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