

Season extension of ever-bearing strawberry in the Pacific Northwest

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Introduction

Locally-grown strawberries can contribute to a more sustainable food system if they are produced using low-impact, environmentally sensitive, and affordable techniques and yield a sufficient return to farm management. Passive solar tactics to advance onset of the local strawberry season could enable farmers to command premium prices for early fruit without burning heating fuel. Consumers could benefit through increased access to high quality, locally-grown fruit.

The growing season for ever-bearing strawberries is often thought to coincide with the frost-free period. Southwest BC's mild winters offer a largely untapped potential for spring production to begin before the last frost and fall production to continue past first frost. This study is intended to foster appreciation for this potential, and inspire and motivate others to test other crops and season extension methods.

This study examines two simple passive-solar season extension technologies, plastic low tunnels and polyester row covers. A plastic low tunnel is constructed from a single layer of transparent greenhouse plastic supported by wire hoops spanning a single growing bed. A row cover is a translucent, water-permeable spun-bonded polyester blanket laid directly over the crop. Both are used to retain heat.



Figure 1. An everbearing strawberry ('Albion' cultivar) under row cover and low tunnel.

Objective

Assess the effect of a plastic low tunnel, a row cover, or both, on peak budding and flowering dates and on overall production of buds and flowers for the first flush of ever-bearing strawberries in spring.

Materials & Methods



Figure 2. Study location, KPU orchard.

The experiment was conducted at the KPU orchard, located at the south end of Gilbert Road, Richmond, near the south arm of the Fraser River (Fig. 2). Soils are shallow muck over Ladner silt loam.

Experimental design: Completely randomized split plot design with four replicates.

- Main plot size: 4.5 x 0.45 m
- Strawberry culture: 2 offset rows (15 cm between plants, 30 cm between rows) in a plastic-mulched flat bed hill system with drip irrigation
- Main plot treatments: Plastic low tunnel or untreated control
- Subplot treatments: Row cover or untreated control



Figure 3. Plot Layout.

Data collection and Statistical analysis:

- All flower buds, open flowers, set fruits, and ripe fruits (marketable and unmarketable) were counted on 11 days between mid-March and late May.
- Peak bud and flower dates, d , were calculated for each subplot as:

$$d = \frac{\sum_{m=03/16}^{05/22} bm}{\sum_{m=03/16}^{05/22} b}$$

Where m = monitoring date between 16 March and 22 May, expressed as Julian date and b = number of buds (or flowers)

- ANOVA was used to test for low tunnel and row cover effects, and any interaction between the two, on peak budding and flowering dates, and the number of buds and flowers produced per plant. All analysis was conducted in the R statistical computing environment.

Results

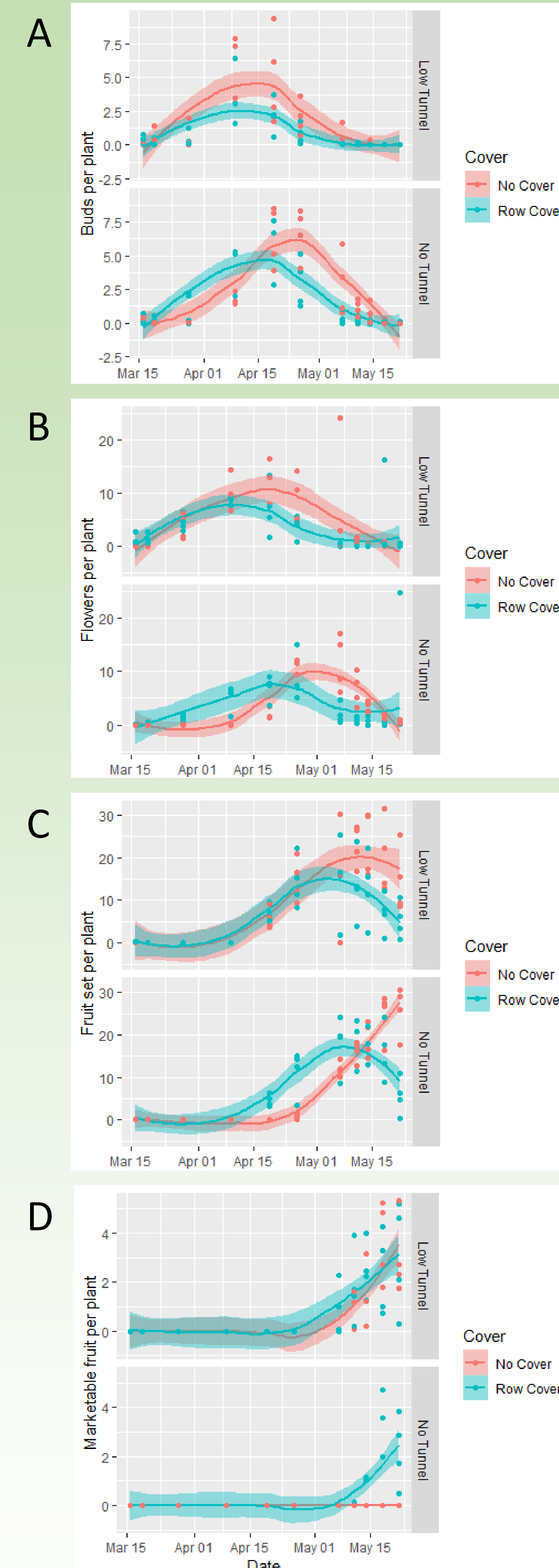


Figure 4. Count of flower buds (A), flowers (B), fruit set (C), and marketable berries (D) in ever-bearing strawberry grown with, and without, plastic low tunnels (top and bottom of each chart, respectively) and row covers (blue and red, respectively) by date.

Results (Cont.)

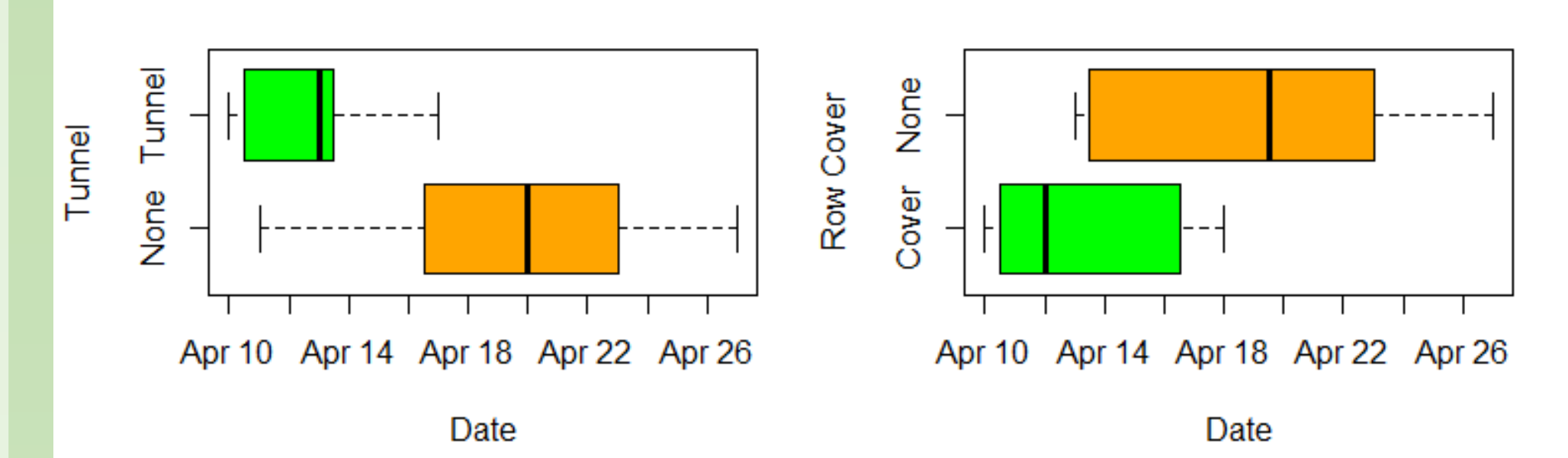


Figure 5. Peak flower bud date with, and without, low tunnels (left) and row covers (right).

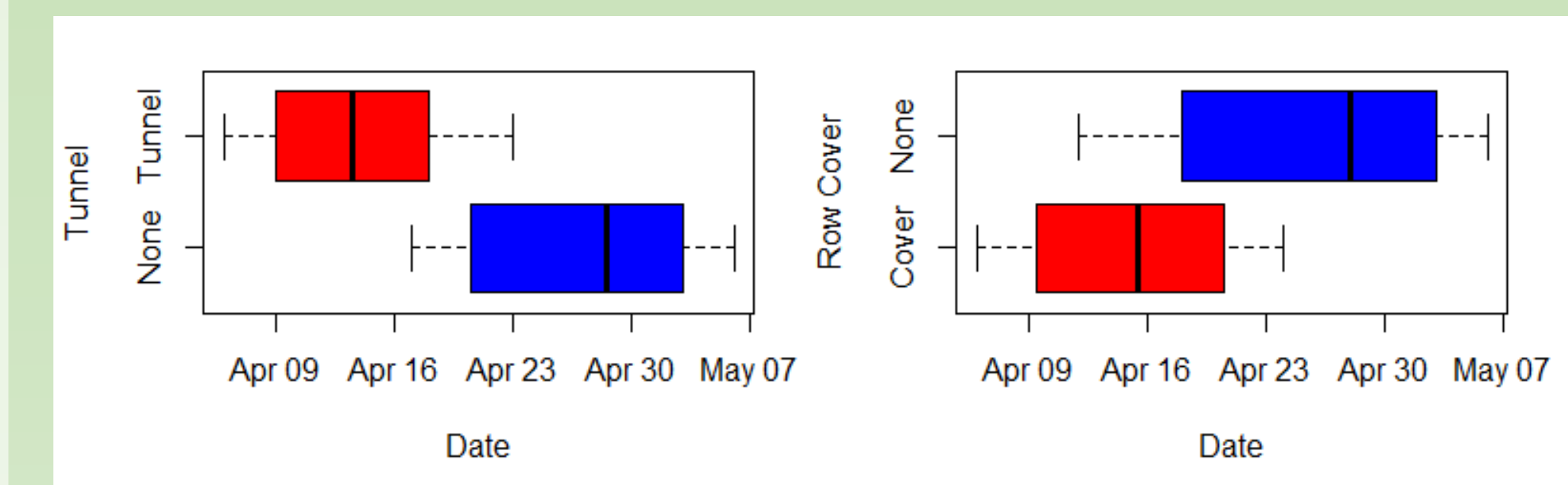


Figure 6. Peak flowering date with, and without, low tunnels (left) and row covers (right).

Low tunnels and row covers both advanced the peak flower bud date by one week (Figs. 4A & 5) and the peak flowering date by almost two weeks (Figs. 4B & 6) relative to untreated controls ($P < 0.01$). No significant interactions were observed between factors. Combining row covers with low tunnels advanced peak bud date by two weeks and peak flowering date by three weeks (Figs. 4A & 4B).

No significant effects of season extension treatments were detected on bud or flower counts per plant over the observation period.

Counts ended before peak fruit set in the untreated control plots (Fig. 4C). Only plots with season extension treatments yielded marketable fruit within the observation period (Fig. 4D).

Conclusions

- Ever-bearing strawberry plants initiated budding and flowering earlier under the low tunnel and row cover season extension treatments, leading to earlier harvest of marketable fruit.
- Buds and flower counts did not increase with row cover or tunnel treatments.
- Further research is needed to follow a complete first cycle of fruit production in the spring, and to determine the potential of plastic low tunnels and row covers to extend ever-bearing strawberry harvest into the fall.

Acknowledgements

Michael Bomford and Rebecca Harbut provided guidance, and Torin Boyle and fellow students assisted with experimental set-up and maintenance. The study was conducted on the traditional unceded territories of the Musqueam and Tsawwassen First Nations.