



CLIMATE CHANGE ADAPTATION PROGRAM

Evaluating the value of Voen Covers in Preventing Rain and Hail Damage

Project Fact Sheet

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Evaluating the value of Voen Covers in Preventing Rain and Hail Damage

Farm Adaptation Innovator Program



Background

Rain splitting and hail damage can devastate a crop causing serious losses of yield. Covers are used in Europe, Chile, and Australia where rainfalls are frequent, in an effort to help reduce splits and subsequent rotting to maintain fruit quality.

When you have a high-value commercial crop, such as Rainier, it is imperative to protect it. Factoring the costs is critical. In addition, all the positives and negatives of implementing the covers must be considered.

This project helped determine the total value of the Voen Cover system.

Study Objectives

- Compare climate data inside and outside of the covers and determine the impacts the covers have.
- Evaluate levels of rain damage under the covers vs outside the covers
- Compare fruit firmness, sugars, and size in covered vs uncovered blocks.
- Evaluate cost effectiveness of the covers for sweet cherries.
- Evaluate the use of irrigation water on covered vs uncovered blocks.

Geographic Applicability

This study was conducted at Coral Beach farms in the Okanagan Valley and findings may be applied to other regions in BC which produce cherry crops.

Commodity relevance

This study was conducted on Sweet Cherries; however, Voen Covers can also be used on other fruit crops that are affected by rain.

Study Timeline

July 2014 – November 2017

Key Findings

- Even under cover, fruit cracking can still occur; however, it is greatly reduced.
- Temperature tends to be between 0.3°C and 3°C warmer under the covers. Humidity also tends to be higher; however, there was no increase in powdery mildew under the covers.
- Blush Colour is moderately affected and additional methods such as leaf pruning and / or the use of 'Extenday' (reflective tarps) under the covers is used to improve colour.



Design

This project was conducted on 11 acres in West Vernon between Summer 2014 and Fall 2017. Samples of 100 cherries were taken each of the four years. Temperature and humidity were monitored by ranch monitoring systems every hour as well as irrigation levels over the four years.

Limitations

This study was conducted on a cherry orchard which depended on summer students to collect data. The students changed each season and as a result variability can be expected despite the same sampling protocols.

In 2015, due to the unexpected early harvest, we were unable to get the Voen covers up in time for proper evaluation.

2016 brought on heavy rains which was our greatest indicator that the covers indeed make a difference.

Figure 1 - Temperature Comparisons (°C)

| 2017 | Covered | Uncovered |
|--------|---------|-----------|
| 01-Jul | 32 | 29 |
| 02-Jul | 32 | 30 |
| 03-Jul | 28 | 25 |
| 04-Jul | 28 | 25 |
| 05-Jul | 31 | 30 |
| 06-Jul | 34 | 32 |
| 07-Jul | 32 | 30 |
| 08-Jul | 31 | 30 |
| 09-Jul | 31 | 30 |
| 10-Jul | 28 | 25 |
| 11-Jul | 26 | 26 |
| 12-Jul | 30 | 29 |
| 13-Jul | 31 | 27 |
| 14-Jul | 31 | 28 |
| 15-Jul | 34 | 32 |

Key Findings

- As you can see from Figure 3 humidity was on average 20-30% greater under the covers when compared to the cherry field directly next to it.
- In extreme heat situations, the covers mitigated stress on trees.
- Due to higher humidity and lack of direct sunlight, the loss of transpiration rate was reduced.
- Firmness of fruit that was covered measured slightly less than that of uncovered.

Figure 2 - Firmness Comparisons: Covered vs Uncovered Rainiers 2016 & 2017 (Pascal or Pressure)

| Covered | Uncovered |
|-------------------|-------------------|
| Average Pa | Average Pa |
| 292.07 | 314.44 |
| Max. Pa | Max. Pa |
| 381.14 | 430.83 |
| Min. Pa | Min. Pa |
| 227.01 | 200.27 |

Figure 3 – Relative Humidity Comparisons: July 2017

RH Comparison

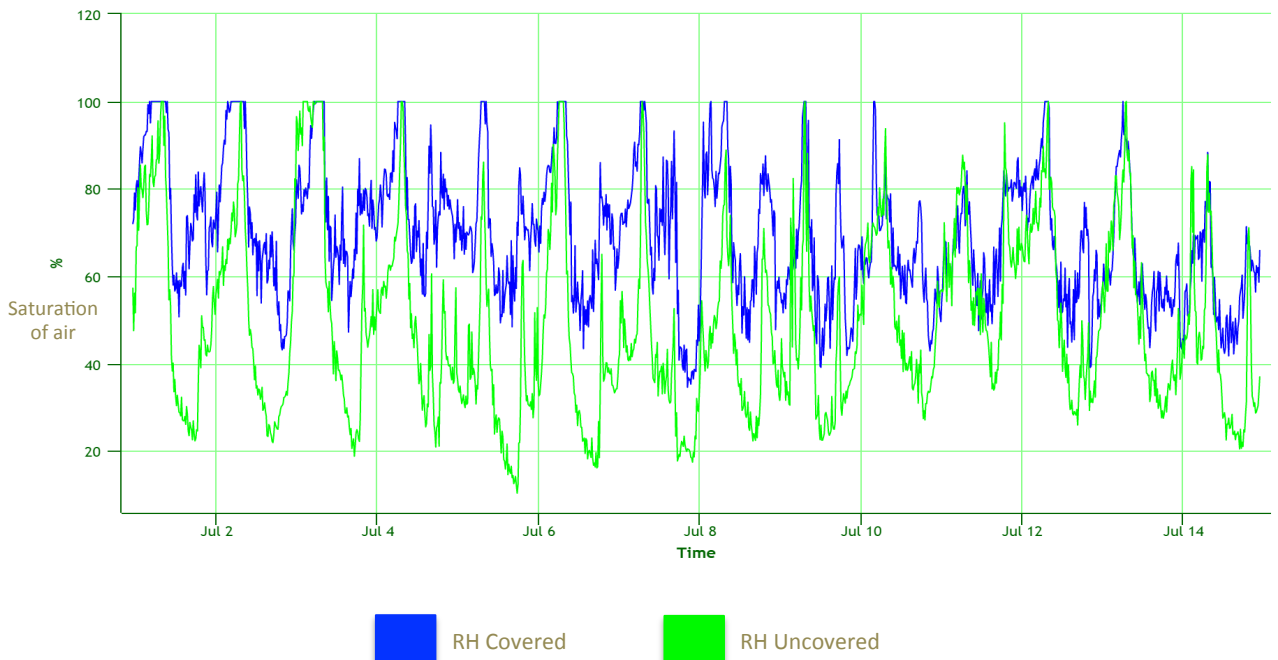
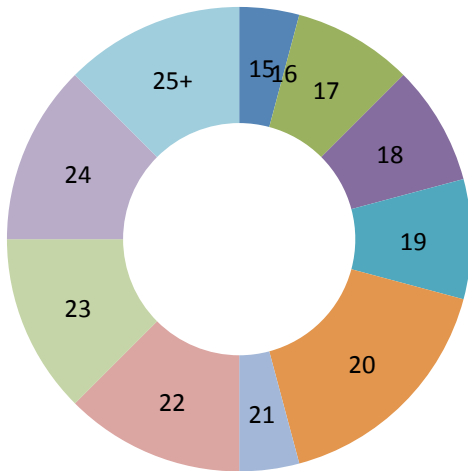


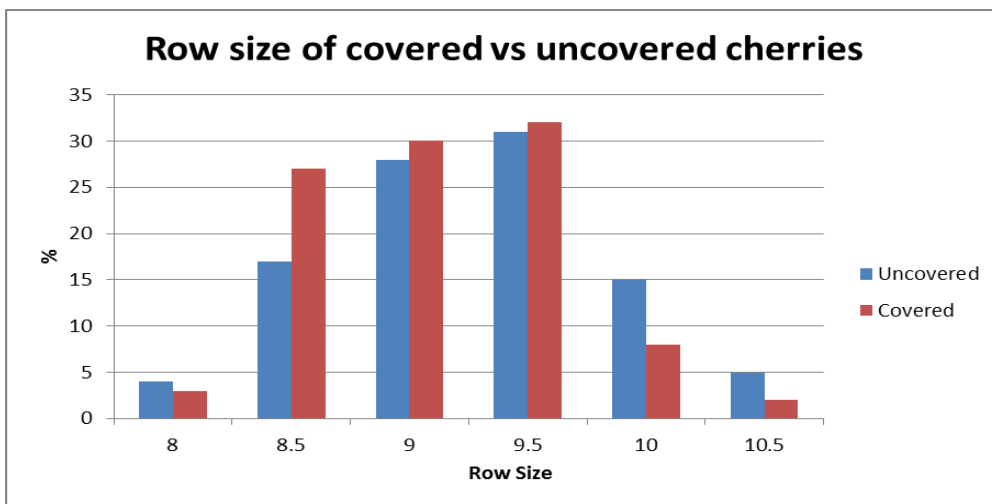
Figure 4 – % Sugar by Mass: 2017 Covered



Key Findings

- Average Brix of uncovered fruit was slightly higher at 20.9% vs 19.8% of covered fruit (See Figure 4)
- Uncovered fruit was smaller with 80% being 9.5 row or bigger, compared to 90% with covered fruit (See Figure 5)

Figure 5 – Sizing Sample: Uncovered vs Covered Cherries



Cost Effectiveness of the Voens Covers

- \$1.33/LB is the recommended Freight On Board (FOB) price premium required for Coral Beach to break even on investment annually over 5 years
- Average Rainier Crop Yield 5 Ton/Acre
- Capital Cost \$25,500/Acre or \$5100/acre annually over 5 years
- Annual install and winterizing costs range from \$2500 - \$3000/Acre
- Average cost of Summer Pruning and rollout of Extenday Reflective Tarps \$3000/acre
- High costs need to be balanced with the potential for less fruit damage. A high value FOB crop and high average yield is arguably required to realize risk vs reward.

Key Findings

- As a result of increased humidity under the covers, irrigation was 30% less than other fields in close proximity.
- There was no evidence of powdery mildew in our consecutive studies and observations.
- The crop under covers and out of the covers demonstrated similar levels of sugars, firmness, and both were enjoyable to eat.
- The covers are not guaranteed protection against rain and hail. They significantly reduce damage but side winds tend to allow penetration in small areas.

Further Information

Follow these links for additional information on related topics:

Voen Covers

<http://www.voen.de/>

BC Cherry Production

<http://www.bccherry.com/>

Cherry Crop Management

<http://www.bctfpg.ca/horticulture/crop-management/>

Conclusion

Coral Beach believes the Voen Covers do provide value. The cost can arguably be offset by the reduction of tractor drying, helicopter drying and use of expensive chemical rain cracking preventative products. The biggest challenge is trusting the protection the covers provide enough to reduce use of these other popular tools.

Next steps

While the findings from this study provide useful information to producers, further work is required before making recommendations to industry. Even though the project officially has come to an end, Coral Beach will continue to experiment and evaluate the worthiness of the covers. Every year continues to be different, presenting new challenges, and evaluations not possible the year before.

Coral Beach is confident enough to extend trials and use of the covers and, as a result, is in the process of covering an additional 12.5 acres in the Coldstream area. This is another high altitude, northern area, where high valued crops prone to splitting are also planted. Following further evaluation, it may proceed to cover additional blocks.

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