

Effect of Extenday™ on light levels, quality and fruit characteristics of ‘Honeycrisp’ apples

R. Crassweller*, D. Decoteau, D. Smith, L. Ball, B. Isenberg

Introduction:

The use of reflective mulch in orchard systems is becoming an increasingly popular way to increase light levels into the orchard canopy. Increased light levels can effect return bloom, fruit set, fruit color and size. The influence of Extenday™ (RF) placed beneath Honeycrisp/M.9 apple trees was investigated in 2007. Extenday™ is a reflective fabric designed and produced in New Zealand. This fabric is durable and resists traffic thus enabling its use for multiple seasons.



| Treatment | # Clusters/cm ² | % Fruit Set | # Fruit Set/cm ² |
|-----------|----------------------------|-------------|-----------------------------|
| Control | 5.5 a | 130 a | 9.1 a |
| Extenday | 8.2 a | 134 a | 13.4 b |
| P-Value | 0.1620 | 0.8877 | 0.0103 |

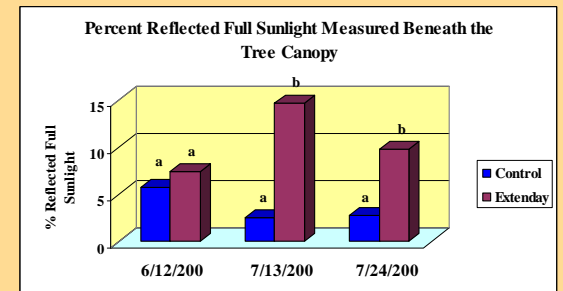
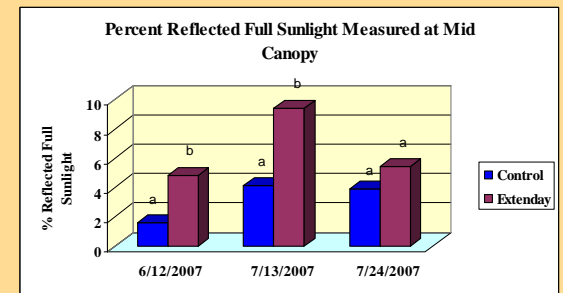
Letters refer to Tukey-Kramer mean separation, P=0.05

| Treatment | # Clusters/cm ² | % Fruit Set | # Fruit Set/cm ² |
|-----------|----------------------------|-------------|-----------------------------|
| Control | 4.4 a | 90.6 a | 2.7 a |
| Extenday | 4.3 a | 91.0 a | 3.6 a |
| P-Value | 0.9965 | 0.986 | 0.4755 |

Letters refer to Tukey-Kramer mean separation, P=0.05

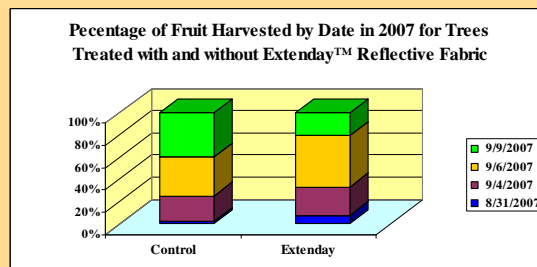
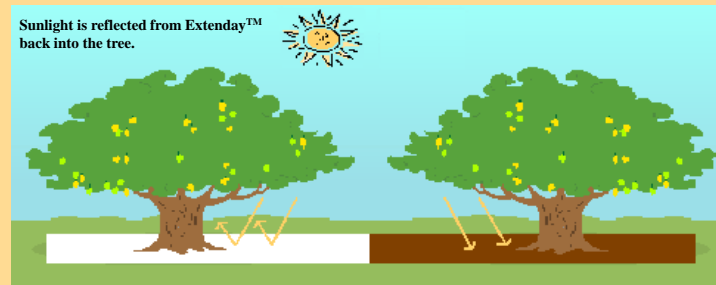
Methods:

Approximately 2 weeks after full bloom, Extenday™ was placed in the herbicide strip on either side of Honeycrisp/M.9 trees located at Horticulture Research Farm at Rock Springs, PA. Experimental units consisted of 3 tree with either the RF or just bare soil (BS) with the middle tree in a completely randomized design. Flower clusters and number of fruit set were counted in spring 2007 and 2008. Percent full sunlight (%FS) reflected from BS and RF was determined on three separate dates in 2007 at several locations and orientations within the tree using a LI-COR Line Quantum Sensor. Fruit were harvested on four dates in 2007 based upon fruit color.



| Treatment | # Fruit/tree | Yield/tree, Kg | Fruit Weight, g | Efficiency, g/cm ² | Crop Load, #/cm ² |
|-----------|--------------|----------------|-----------------|-------------------------------|------------------------------|
| Control | 171 a | 30.14 a | 178 a | 71 a | 4.2 a |
| Extenday | 226 a | 36.55 a | 161 a | 104 b | 6.5 b |
| P-Value | 0.0543 | 0.2072 | 0.2549 | 0.0147 | 0.0235 |

Letters refer to Tukey-Kramer mean separation, P=0.05



Results and Discussion:

There was no difference in %fruit set between treatments in 2007 and 2008. Fruit density was significantly higher on limbs in the RF treatment in 2007. At harvest there was no difference in #fruit/tree, yield/tree or fruit weight in 2007. Tree efficiency and crop load was higher for RF plots. The percent of fruit harvested by treatment on any given date tended to be higher from RF trees harvested on the first three dates. Maturity Starch Index was significantly higher for fruit from the RF treatments with no difference in firmness or soluble solids for fruit harvested on the second harvest. On 12 June 2007 reflected %FS at the mid canopy level was greatest for RF treatment. On 13 July 2007 at all positions measured in the tree, %FS reflected was significantly greater in the RF trees. On 24 July 2007, %FS reflected was significantly greater in the RF trees at 3 out of 4 positions within the canopy. On 19 September 2007, spectroradiometer readings indicated that reflected blue light (400-500 nm) from the RF trees was higher than either the BS or from adjacent grass drive row. The R/FR ratio was also higher in the RF than in the BS or from adjacent grass drive row. Light measurements and yield data are being collected in 2008.