



Figure 1. Lettuce grown under our original hooped Solexx design.

Growing Lettuce at High Elevations Using Season Extension Covers

Introduction

In high elevations, it is suggested to gardeners that cool season crops like lettuce will be the crops that could do well in the climate conditions. Because they are cool-season crops, there often is not any advice on additional techniques to use to increase yield or quality. The CSU Extension office in San Miguel Basin wanted to test additional growing strategies and see if there was a way to get better yields through season extension practices. Season extension is the practice of adding to the frost-free growing season length and creating better growing conditions a specific crop needs to produce good quality yield. Locations at high elevations, such as Telluride, CO (8,750 ft.), experience shorter growing seasons and could benefit from these season extension practices. To test different methods of extension we grew many varieties of lettuce in 2012, 2013, and 2014 (Figure 1). The varieties included varieties such as Spotted Trout, Cimarron, Tom Thumb, and Cardinale and the covers included a control, 30% row cover material, a Solexx roof, Diobetalon, and a greenhouse cover consisting of Diobetalon and our row cover (GHC). The San Miguel Basin CSU Extension office has provided literature of the advantages and disadvantage of these different season extension covers which can be found [here](#) or on their website. The average ounces per head of lettuce were calculated for each of the varieties and each of these treatments.

How We Grew High Elevation Lettuce

In areas where temps drop below freezing and soils freeze, growing in a raised bed can help you keep plant production longer. The benefits of these raised beds can also be increased by utilizing a cover over the crop like fabrics, hard plastics, or plastic sheeting. Our study looked at two of these categories by growing plants under 30% row cover + Diobetalon, a Solexx cover, and Diobetalon in 2014. These materials were chosen for the best light permeability and aeration for the crops.

Our raised beds were filled with [native soil](#) and amended with compost and/or peat moss. We also used straw as a ground cover or mulch because this helps with weeding and insulates the temperature of the soil. By growing in raised beds with the combination of a row cover you can also see benefits in pest

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prevention whether it is disease, insects, or some of the larger pests seen in higher elevations such as rabbits and deer (Figure 2).

Our Planting Dates

We planted green, spotted, and red varieties of lettuce to see how different types would perform in the high-elevation conditions of Telluride. We direct seeded our lettuce into the beds starting in mid to late May and each year we planted a little earlier (mid to late April). Germination cloth was kept on tops of the seedlings until they had a second set of true leaves to retain moisture and help them establish. We had two plantings in 2011 and 2012. In 2014, we had four total plantings. It is important at higher elevations to plant once the ground is no longer frozen for the best transplanting success. Plants were planted about 8-10 inches apart within a row and the rows were planted 10-12 inches apart.



Figure 2: Lettuce grown under our control protected by a chicken wire layer.

How We Harvested

We harvested our lettuce on average 75 days after planting. During the years of 2012 and 2013 we planted full beds, but in 2014 we adapted to succession harvesting from each planting so that we were consistently harvesting lettuce heads all season. We checked our plants frequently to make sure to harvest before they bolted. When harvesting the heads, we cut at the base plant right above the soil. This allowed us to maximize harvesting the lettuce we produced and get accurate head weights for our data collection.

Pro Tips/Observations

- Succession planting can be beneficial and less wasteful if you are growing for your home, so you have lettuce consistently and not a lot of lettuce all at once.
- While we direct-seeded in our trials, members of our team observed that if you transplant seedlings instead you may see a reduction in pest damage to the seedlings.
- The covers that allow light in will produce bright colored red lettuces and the covers that allow less light in will produce muted red colored lettuces.

Differences in Season Extension Covers

The control in our study was a raised bed without a crop cover with a hoop structure with plastic chicken wire over the top for protection from pests like deer and rabbits. Our 30% row cover layered with Diobetalon treatment and Solexx treatments were placed on a hoop structure as well, but in 2014 the Solexx treatment was adjusted to a rigid structure closer to a cold frame with a top panel that allowed access to the plants inside.



Between the three growing seasons, the Diobetalon treatment performed the best of the season extension covers. The 30% row cover combined with Diobetalon, and control yielded around the same amounts, but Solexx did not perform well compared to the others.

The Diobetalon treatment had the better influence on the coloring of the red lettuce varieties. Red lettuce grown in Diobetalon was redder than the ones grown under Solexx (Figure 4).

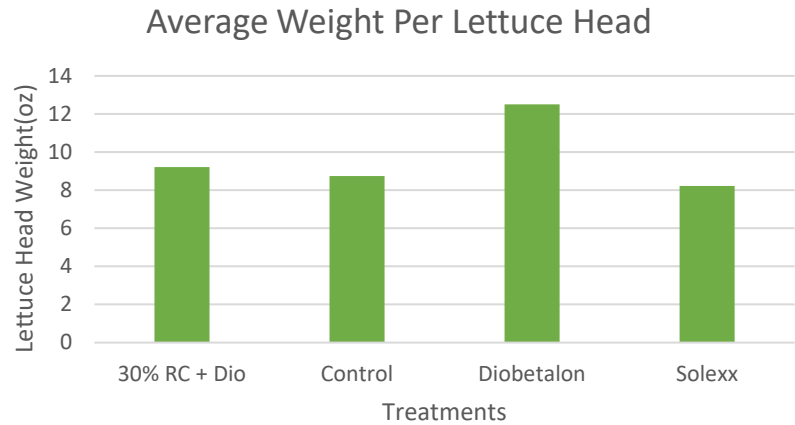


Figure 4. Coloring differences between Solexx and Diobetalon covers.

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