



**Figure 1.** Broccoli growing under season extension covers in 2016.

## Growing Broccoli at High Elevations Using Season Extension Covers

### Introduction

In high elevations, it is suggested to gardeners that cool-season crops like broccoli will be the crops that could do well in that climate's conditions. Because they are already 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 to add to the time and create 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 season extension covers. To test different methods of extension we grew five varieties of broccoli in 2016 and 2023. The varieties included 'Solstice', 'Nutribud', 'Umpqua', 'Calabrese', and 'Belstar' and the covers included a control, 17% and 30% row cover materials, a Solexx rigid cover, and Diobetalon (Figure 1). 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 weights of heads and shoots were calculated for each of the varieties and each of these treatments.

### How We Grew High Elevation Broccoli

In areas where temps drop below freezing and soils freeze, growing in a raised bed can help you keep plants alive longer. The benefits of these raised beds can also be increased by utilizing a season-extension cover over the crop like fabrics, hard plastics, or plastic sheeting. In our study we chose materials for our covers 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 insulating the temperature of the soil. By growing in raised beds with the combination of a row cover you can also see benefits in pest prevention whether it is disease, insects, or some of the larger pests seen in higher elevations such as rabbits and deer.

**Key Words:** Diobetalon, Solexx, Row Cover Fabric, 'Solstice', 'Nutribud', 'Umpqua', 'Calabrese', and 'Belstar'



## Our Planting Dates

For our trials we chose to grow four open-pollinated varieties and one hybrid variety (Belstar). These varieties were chosen because they were described to be good side shoot producers after they produced their heads. We started our broccoli from seeds inside in early April and then transplanted them into our raised beds in late May. We planted five plants per variety in each treatment in 2016 and three plants per variety in a treatment in 2023 with 6-18" inches between plants. By starting your plants inside you can increase germination rates and allow your seedlings to establish in a more controlled environment. It is important at higher elevations to plant once the ground is no longer frozen for the best transplanting success. Broccoli can be planted several weeks before average last frost dates.

## How We Fertilized

Our trials were focused on organic production, so we chose to use organic sources of fertilizer for our broccoli. We fertilized our plants with blood meal three times during the growing season since broccoli is a heavy feeder. The applications occurred at the following times in 2016: one week prior to transplanting, once when the head was the size of a quarter, and the final time when the head was cut off. This final fertilization helped to promote the production of the side shoots. In 2023, the plants were fed every 3-4 weeks at the root zone starting at transplanting. Blood meal is a dry nitrogen fertilizer source and should be placed in the root zone of the plants making sure to follow the application rates recommended on the package for best success.

## How We Harvested



Broccoli can be harvested in two different rounds: heads, followed by side shoots (until the frost). We removed the broccoli material from the plant when the heads and shoots were deep green before the florets began to lengthen and turn yellow. Broccoli heads were harvested in late July through August with the latest harvests of shoots being around early October. When harvesting the head, the cut should be made above a set of lower branches to stimulate growth. Regular harvest of shoots will help produce a higher shoot yield overall. Side shoots began being harvested around one month after the head was removed. Shoots should be removed at the axils of the main stems of the broccoli. For higher yields of the varieties we trialed, the Nutribud (NB) variety had the best average weight of head

per plant. Umpqua (UQ) and Solstice (SO) performed less than NB, but still had successful harvests for the average head weight. The shoot weight per plant was consistent between the three varieties with Solstice on average yielding the highest average shoot weight.

## Pro Tips/Observations

- Consistent watering and fertilization will ensure good head formation and production of side shoots.



- Season extension covers will reduce cabbage butterfly access to lay eggs on plants and reduce cabbage worms.

### Differences in Crop Covers

The control in our study was a raised bed without a crop cover and the three other covers that we tried were a hard Solexx cover, a fabric cover called Diobetalon, and 17% and 30% row cover fabrics. The fabric covers were applied on a hoop structure placed on top of the raised bed edges. The control also had a hoop structure with plastic chicken wire over the top for protection from pests like deer and rabbits. Our Solexx treatment had a rigid structure closer to a cold frame greenhouse with a top panel that allowed access to the plants inside.

In 2015, the row cover treatment was the best at producing side shoots and Diobetalon performed best for average broccoli head **weight**.

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