

## Low Tunnels at Tobacco Road Farm

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Low tunnels are protective structures made of hoops and clear plastic or polypropylene row covers for growing a wide variety of crops. They are generally low enough that the covers are removed for harvest or other field work, which differentiates them from high tunnels. Inexpensive and quick to setup and take down, they are useful for earlier and later crops, overwintering, and moderating summer conditions.

The standard tunnel used on our farm covers a 36" raised bed and is 40 feet long. The beds have an 8" wheel track between them where the covers overlap and sandbags are placed to secure them. 36" wide beds are used because these narrow beds are better able to resist snow load, and the tractors are able to straddle either one bed (Farmall Cub) or two beds (Farmall Super C) at a time. The same bedding system is used with or without tunnels in place. Wider tunnels are sometimes used on fields laid out with 58" beds. The beds are divided into 40 foot lengths because this allows two people to easily cover or uncover the beds from the ends, and also cuts down on the wind lifting the covers.

The standard 36" bed uses 3/16" or preferably 1/4" thick round stock steel, 6'8" long. This solid steel drives easily by hand into the ground. The 1/4" steel holds snow load better and hoops are placed 2 feet apart for overwintering, or 4 feet apart during minimal snow periods. Hoops are purchased from a local metal working shop, often cut from 20 foot lengths to 6' 8", though galvanized hoops of 3/16" width are available from some produce supply companies.

The covers used on the tunnels vary with the season. Light weight polypropylene is used for summer insect protection or to encourage growth in hot weather. Medium weight polypropylene (often 2 layers thick) is used to protect crops in fall for harvest in cooler temperatures. Clear plastic covers are used to encourage growth during fall and winter. The covers are about 8' wide to cover a 36" wide bed. They are cut to 50 feet to cover a 40 foot bed. The clear plastic is double layered. The inner cover is perforated 2 mil plastic, purchased from Dubois Agrinovation in Quebec in 33 foot wide widths that must be cut on the folds to 8'3" widths. The outer cover is 3 mil solid greenhouse plastic available from Griffin Greenhouse Supply, cut to 8' widths. The inner cover is in place from October to March, the solid cover is used when temperatures are low and when growth needs to be encouraged. The critical step of proper venting is achieved by partial to total removal of the solid outer cover.

The tunnels are secured by 6 mil UV treated black sand bags. They are purchased from Rain-Flo Irrigation or Nolts Produce Supply. Each 40 foot length has five sandbags placed down each of its sides. These hold down two adjacent covers. Depending on windbreaks and wind exposure, more may be required. Polypropylene covers require less sandbagging.

Low Tunnels require careful management as there are many details in their successful use. However, once mastered they lend themselves well to securing the lucrative early, late and winter markets. Large area can be covered inexpensively, and these areas readily convert to regular uncovered production. The covers last for several years if carefully stored between usages, the sandbags hold up well piled outside, the hoops last more or less indefinitely. We have demonstrated the use of these structures for more than twenty years, and at this point they are a relatively common sight on Connecticut vegetable farms.

2016 pricing for construction of low tunnels

1 tunnel, 3' x 40' = 150 sq. ft (120 sq. ft growing area, 30 sq. ft wheeltrack)

280 tunnels per acre at 150 sq. ft each

50' perforated cover = \$15.80

50' solid 3 mil cover = \$23.00

3/16" hoops = \$0.50 each, 20 per bed = \$10.00

In total, \$48.80 per bed

One acre covered = \$13,664 (33,600 sq. ft growing area)

Low tunnels have maintained better soil fertility over the many years of usage, compared to the high tunnels. This may well be due to the soils being less cut off from atmospheric conditions since the tunnels can be relatively easily exposed to air and rain. This ability to remove covers also generally means a shorter period of coverage, as individual beds may be switched to cloth covers, or completely uncovered earlier. The soils also stay much more naturally hydrated through the wicking of moisture from the relatively close wheel tracks. This ability to maintain and improve soil conditions, while producing large volumes of off-season crops, is very rewarding.