

LOW TUNNELS (HOOP HOUSES or QUICK HOOPS) Wes Harris, USDA-FAS: RC(SW)



- Plastic covers (1.0 to 1.5 mil thick) are supported above the crop by wire hoops made of No. 9 wire cut to lengths of 65 to 72 inches.
 - The ends of the hoops are inserted 6 to 8 inches into the soil on each side of the row so that the width of the hoop at the base is 24 to 36 inches and the height at the apex of the hoop is 14 to 18 inches.
 - The hoops are spaced about 4 feet apart in the row.
 - Many variations of these dimensions, depending on crop size.
 - The edges of the plastic are not buried so that the cover can be raised and lowered for ventilation.
 - Some labor for manual ventilation. Daytime opening is necessary for crops such as tomatoes and pepper if the temperature under the cover is expected to exceed 90° F (32° C) for several hours.
 - Cucurbits (melons, cucumbers, and squash) are more tolerant of high temperatures.
 - Depending on the crop and the environmental conditions, the covers are left in place for 3 to 4 weeks and then removed.
 - For crops requiring bee pollination, the covers are removed about the time of the appearance of the first female flowers.
 - For wind pollinated crops (tomato, pepper, eggplant), time of removal is somewhat temperature dependent since temperatures should not exceed 90° F at the late bud to open flower stage for more than a few hours.
 - US cost for low tunnels is approximately \$0.25 per ft². A 36 inch by 100 ft row would cost approximately USD 75.00. A jerib (0.2 Ha with 36 in row gaps) would cost approximately USD 2,700.

ADVANTAGES:

Frost Protection

Depending on the material, the frost protection factor is from 2° to 7° F. Heavier materials give greater frost protection but tend to exclude more light. Can also be used with some crops in the fall for late frost protection.

Early Yields

The greenhouse effect of most row covers will not only warm air, but will also result in warmer soil temperatures, enhancing seed germination, root growth, shoot growth and maturity. Early crop production generally results in higher crop prices at local markets. When combined with black plastic mulch, many crops may mature one to three weeks earlier than under normal.

Increased Yields

Many cucurbits (squash, cucumbers, melons) respond well under row covers with increased yields of as much as 25 percent. Earlier production of cool season crops like spinach and leaf lettuce will also increase total yields. Other crops that have responded include tomatoes, peppers, eggplant, cauliflower, strawberries, sweet corn, cole crops (mustard and turnips) and peas.

Wind Protection

Hoops will protect crops from wind and blowing sand. This will result in less plant stress and reduces desiccation of delicate early growth.

Pest Protection

Some protection from insects and birds may be attained by low tunnels. If so, less pesticide use will occur.

Water Conservation

Less irrigation may be required as water collects as condensation on the inside of the cover and returns to the soil. Less crusting occurs since wind movement and water evaporation is reduced.

DISADVANTAGES:

Cost

Increased costs limit use to high-value horticultural crops. Crops requiring a supported row cover will incur greater costs associated with wire hoops. The closer the row spacing the greater the cost. A major difference in the cost of materials exists due to heavier materials being more expensive.

Water Use

Overall water use may increase since crop growth is greater, earlier and over a longer period of time.

Pests

Although row covers are often used to exclude insects, any insects that do enter the covered area can multiply very quickly in such a favorable environment. Weeds can spread very quickly under these benign conditions. Preemergence herbicides are a necessity or the plastic will need to be removed for hand weeding. Same requirement exists for pollination of such crops as cucurbits and strawberries.

Labor

Requires considerably more labor input earlier in the season than traditional production techniques. This is particularly true if the row cover has to be occasionally removed to weed, apply insecticides or allow for pollination. However, labor is plentiful.