Site Selection

David Wildung and Pat Johnson, University of Minnesota

Since a grower will be producing a high quality product and using a high level of management, the site and soil should be considered with great care. Even though, by definition, a high tunnel is not a permanent structure and should not be considered such, site selection is important in the success of the high tunnel. What often is not considered permanent becomes so after a few years.

The most important aspect of site selection should be good soil drainage and an elevation above the surrounding area. The location should be slightly higher than the surrounding area so water will not drain into the high tunnel or flow through it if heavy rains occur. The site should be level so that tillage such as bed making is easier. In addition, a level site is important for irrigation so more uniform water distribution can occur. Problems with elevation should be corrected before any construction occurs. At Grand Rapids, the location we chose to put our high tunnels was slightly lower than the surrounding area.

We removed the top 12 inches of soil, backfilled with 8 inches of washed sand, and then put the original soil back. As each layer was put back it was incorporated and mixed by tilling with the layer below it. In all operations, care was taken to minimize compaction of the soil. The result was an elevation that was several inches above the surrounding area and a site that was level for the high tunnel frame. While this preparation took considerable time initially, it has provided a location that has produced good crops with no drainage problems.

Figure 1. Sand added to site

Figure 2. Preparing the planting bed

Figure 3. Subsoiling the planting bed
Soil type is limited to the soil type on your farm. Internal soil water drainage should be a consideration; but since all of the water will have to be provided by irrigation, the grower can control the water needs of the plants for the most part. Lighter textured soils like sandy loams or loamy sands are most desirable because they will warm up more quickly in the spring, are easily worked, provide a good media for root development and respond more readily to irrigation and fertilizer applications. Returning organic matter to the soil should be an important consideration when long-term use in the same location occurs. With the intense management and heavy crop nutrient use in high tunnels, soil organic matter can be depleted more quickly than under traditional field production systems. Because of the potential of diseases and insects, crop residue from high tunnel crops should not be incorporated back into the soil.

Orientation of high tunnels is often a matter of personal preference. Successful production has been obtained with east-west or north-south orientation. Everything else being equal, a north-south orientation is probably best for optimum sun exposure and less shading, particularly with close row spacing and the use of a trellis system that results in tall plants. A north-south orientation will warm up more quickly on a sunny morning, but typically by 9:00 AM high tunnels have to be opened because they are too hot anyway.

While high tunnels can be shut down during strong winds, a windbreak on the windward side of the tunnel may be helpful in reducing the effect of strong winds. Since most of our strong winds come from the southwest or northwest, a windbreak on the west side of the tunnel may be beneficial. A deciduous windbreak on the west side of a high tunnel will provide wind protection and slight shade from hot afternoon sun during the summer. In the fall, the deciduous windbreak will lose its leaves to create less shade when the sun angle is lower and more heat is needed in the tunnel. Since some light air movement is advantageous in the high tunnel to assist in pollination, a deciduous windbreak, which allows more wind through than an evergreen windbreak, is more desirable.