Ten Reasons Not To Grow Tomatoes in High Tunnels

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Every good reason to grow tomatoes and other high-return vegetables and small fruits in high tunnels has a compelling argument to counter it. These potential pitfalls of tunnel culture are seldom mentioned in the rush to put a high tunnel on every farm.

1) Return on investment: Input costs are substantially higher in a tunnel versus the field. After amortizing the costs of the structure, the plastic film, and other specialized equipment required to effectively produce in a tunnel, a field planting has much lower input costs. Yes, increased yield, higher quality, or market window can justify the increased costs of tunnels. However, we have observed some poorly managed tunnels with yields equal to or less than field plantings. Consider the worth of every square foot of production space and manage that space with the goal of justifying the increased input costs.
2) Increased risk: Greenhouses and high tunnels are typically engineered to balance the environment with the need to keep material costs low. On occasion, metal tube structures and crops fail. Considering your investment in the tunnel itself, the costs incurred in producing a crop, and your anticipated return on investment, growing in protected culture requires greater attention to details and pest management in order to realize economic goals.
3) Increased pressure from insects and arthropods: Although tunnel culture allows the opportunity for higher crop quality, Aphids, Whiteflies, Western Flower Thrips, Spider Mites, and Broad Mites also thrive under tunnel conditions. The dry foliage, stems, and fruit grown under intense irrigation and fertigation are ideal environments for these pests to flourish. Without rainfall, a population of Spider Mites can increase extremely rapidly unless carefully managed. Scout regularly for pests and use proactive pest management that includes banker plants such as Black Pearl and Purple Flash peppers hosting Minute Pirate Bugs (*Orius*). Every crop reacts differently under tunnel conditions versus field conditions.
4) Irrigation management requires greater care: This is especially so on the margins of the season, when there are often days with little sunshine, and you must react to rapidly changing conditions. Learn to grow dry(er) during the early and late season to reduce root-borne diseases. Know when to increase irrigation flow to maximize plant growth and reduce cracks and Blossom End Rot. Invest in tensiometers or irrometers to monitor root zone moisture levels. Tunnels will require more irrigation than field plantings; farms with a less than adequate water supply should consider tunnels with caution.
5) Increased disease pressure: Tunnels do reduce diseases such as Early Blight and Septoria Leaf Spot but exacerbate other diseases. Brown Leaf Mold, Powdery Mildew, and Botrytis, only occasionally seen in field-grown vegetables, are standard fare under high tunnel conditions. Increase air flow, reduce humidity, and use disease-resistant varieties to help manage these diseases. Brown Leaf Mold in tomatoes is almost exclusive to tunnel-grown tomatoes. We are finally seeing the release of the first tomato varieties with strong resistance to leaf molds. Check with your Extension Specialist / Horticulture Educator for the latest on recommended tunnel varieties.

6) Tunnels perpetuate viruses: Tunnel tomatoes are a 'hands-on' crop, as many growers have come to appreciate the benefits of greenhouse methods of pruning to improve yields. However, viruses such as Tobacco Mosaic (TMV) are spread mechanically by workers who move the virus down the row with weekly suckering or pruning. Field tomatoes see much less handling and thus are generally at lower risk. High-technology greenhouses have disinfection protocols in place to reduce viral spread, but a high tunnel's soil-based system is more difficult to disinfect than a concrete floor. A high tunnel, with characteristics between a greenhouse and a field, perpetuates TMV. So how to prevent TMV in tunnels? Buy only from reputable seed sources, consider seed treatment, and remove suspect plants immediately. Disposable gloves, regular hand washing, and tool disinfection will reduce the spread of viruses and other systemic diseases. Commercial pruning tools with reservoirs to disinfect the blade continually during use are now available.
7) Soil health and nutrition: Tomatoes are the single most popular high tunnel crop due to their high return on investment and high market demand. There is considerable pressure not to rotate tunnel crops as you would field crops. This can result in steadily increasing soil-borne diseases such as Fusariums and Verticilliums. Use only the best quality plants from known and trusted sources, and inoculate plant roots with Actinovate AG, RootShield Plus, Companion, Cease….(There are an increasing number of biological root inoculants available.) These practices reduce the potential need to fumigate.

   In addition, tomatoes are heavy feeders, making strict attention to soil tests and tissue analysis especially important in the usually higher (than field) densities used in high tunnels. Maintaining recommended levels of Ca, Mg and K is often challenging in tunnels. Since it never rains in a tunnel, all nutrients that the roots utilize are within the drip irrigation zone. This root area can quickly become exhausted of nutrients. Both injected and foliar-applied nutrients are necessary to maintain nutrient levels at their optimum levels during ideal growing periods.
8) Negative R values: Under early and late season short, cloudy days and clear, cold nights, it is possible to have the low temperature in a high tunnel be lower longer than outdoors. Cold nights, particularly in spring, can see temperatures lower inside the tunnel than out (hard to believe, but true). Under these conditions, a set of heavy floating row covers can help to keep a crop alive, but many growers opt to use a low output heater to keep temperatures above 45-50°F. In general, an unheated high tunnel can be reliably planted with tomatoes about four weeks prior to the normal outdoor planting season. Adding heat can speed up successful planting by eight weeks or more.
9) Increased management and labor: It is more challenging to manage tomatoes, peppers, cucumbers, strawberries, and raspberries indoors. Pest populations and infestations tend to come on quickly, requiring a strong proactive management program. Narrow aisles require careful attention to crop canopy management, so pruning and trellising are constant chores. Is there room within your schedule as manager to accommodate the increased demands of a tunnel? We have seen many cases where the answer is No.
10) Playing field irregularities due to subsidized tunnel purchases: Recent grant programs have created two levels of tunnel purchases, those that are subsidized and those that are not. Growers who purchased their tunnels without the grant subsidy may have paid 40-60% more for

their first high tunnel. If you are not a grant recipient, your input costs will be higher, and your margin lower, than others.

We remain optimistic about the role of high tunnels on vegetable farms, but they are not ideal for all farms. Here we have presented some of the less glamorous aspects of tunnel production to balance the many favorable programs we've conducted for many years. These challenges must be met by growers currently using high tunnels and carefully weighed by growers considering them.