Zero Disease Tolerance in High Tunnels

By following 20 practices, growers will reduce the potential of pathogens taking over in tunnels.

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  An important feature of high tunnels is the ability to roll up sides for ventilation. Photo credit: Margaret T. McGrath

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Keeping crops free of disease is the goal of all growers, including those producing in high tunnels. What follows are 20 practices that will reduce the chances of pathogens taking over when growing under cover.

1. Locate and orient high tunnels so they will receive good sunlight and air movement. An east to west orientation, perpendicular to prevailing winds, and away from shade of trees or buildings is ideal.

2. Choose a roof design that minimizes condensation dripping on plants. Condensation occurs on tunnel plastic over night because as temperature decreases, air can hold less moisture. Also vent tunnels early in the morning to dry condensation.

3. Be sure to select seed that is pathogen-free.

4. Plant resistant varieties.

5. Add compost and other sources of organic matter to soil to promote beneficial microbes.

6. Cover the ground with plastic mulch. This raises soil temperature and prevents evaporation of soil moisture, plus serves as a barrier for pathogens in soil that infect above-ground plant parts.

7. Use raised beds to manage soil moisture.

8. Practice good sanitation. Clean and disinfect tunnel structure and planting materials (including tools), and wear gloves. Minimize worker movement between tunnels to avoid moving pathogens.

9. Avoid moving soil on shoes or tools from fields into high tunnels and between tunnels.

10. Separate plantings of a crop inside and nearby when feasible. An older planting can be a source of pathogens for a younger planting in the same high tunnel; however, this needs to be balanced with crop rotation needs.

11. Grow ornamental crops separately. They can be sources of some viruses, notably tomato spotted wilt virus.

12. Provide appropriate fertilization (especially nitrogen; avoid excess), soil pH, temperature for good growth, and consistent soil moisture.

13. Control weeds and volunteer crop plants inside and around high tunnels.

14. Minimize humidity by using wide rows and plant spacing, fans, ridge venting, open sides. Orient rows to air movement, avoid overwatering, irrigate with drip, and prune old leaves and dead tissue.

15. Rogue affected plants and plant tissue when appropriate and feasible. This is especially important when causal pathogens can survive a long time in the soil.

16. Use plants grafted onto resistant rootstock for soilborne pathogens.

17. Apply fungicides. Start at or before first symptoms. Ensure disease is correctly identified. Apply regularly, maximizing coverage. Check state regulations about pesticide use in high tunnels, which many consider to be a greenhouse. A few states do not if the sides are rolled up at the time of the application. Choose product labeled for target disease. Check label for restrictions on greenhouse use.

18. Remove crop debris including roots after harvest. Dispose far from high tunnels.

19. Rotate where crops are produced. The goal of rotation is to manage soilborne pathogens. Clean rototillers and other soil tools between production units. This can be challenging when these units are within one high tunnel, but in this situation it is absolutely essential as moving soil between units could defeat the purpose of rotation.

20. Grow a biofumigant cover crop to manage soilborne path-ogens when there is sufficient time between crops.