

Seasonal Tunnel System for Crops

Interim Conservation Practice Job Sheet

798



Definition

Seasonal Tunnel Systems for Crops are seasonal polyethylene covered structures used to cover crops to extend the growing season in an environmentally friendly manner. Seasonal Tunnel Systems are not heated and depend on the plastic covering to modify internal climate to the advantage of the plants growing inside.

Purpose

Seasonal Tunnel Systems for Crops are used to extend the crop growing season, improve plant quality, improve soil quality and improve water quality from reduced nutrient and pesticide transport. The growing season can be extended by 2-4 weeks by

protecting crops from potentially damaging weather conditions. Due to the microclimate inside the tunnel crops tend to be of higher quality and produce higher yields than field-grown crops. Soil quality is improved by the use of increased management techniques in the tunnel, the addition of compost or organic matter and a decrease in the potential for soil erosion. As plants inside the tunnel tend to experience less disease and insect pressure, fewer pesticides are used reducing the risk of pesticide transport.

Where used

Seasonal High Tunnel Systems are used on land where crops are grown and an extension of the growing season is needed due to climate conditions

and where crops can be grown in the natural soil profile. Seasonal High Tunnel Systems are not recommended for crops that are grown above the ground that do not utilize the natural soil profile, or for plants grown in pots or containers.

Resource management system

Seasonal High Tunnel Systems are normally established concurrently with other practices as part of a resource management system for a conservation management unit. Examples include practices such as conservation crop rotation, irrigation water management, nutrient management and pest management. Managing crop residues within the tunnel can help improve soil quality. The cropping rotation used inside the tunnel shall have a positive soil conditioning index and a soil loss of less than the tolerable limit.

The irrigation water applied under the tunnel system shall not exceed the available water capacity of the soil to avoid runoff and leaching below the root zone.

The sides of the tunnel structure shall be down and ends closed when pesticides are applied inside the structure and/or when pesticides are applied to crops adjacent to the tunnel structure.

Operation and maintenance

An operation and maintenance (O&M) plan must be prepared and reviewed with the landowner or operator. The O&M plan shall provide specific instruction for proper operation and maintenance of the system and shall outline the level of repairs needed to maintain the effectiveness and useful life of the seasonal high tunnel system. The covered area should be inspected periodically and repaired as needed. To prevent damage from heavy snow loads, the tunnel cover shall be removed at the end of the growing season.

Specifications

Structures shall be obtained from a commercial source. There are many commercially available Seasonal High Tunnel structures on the market. These structures, sold as kits, generally contain all of the required materials and hardware to erect the structure except for the lumber needed for baseboards and end walls. Individual kits vary by supplier and manufacturer; therefore, care should be exercised when comparing kits prior to purchase.

Seasonal High Tunnel structures shall be of adequate size to obtain 100 percent coverage over the crop area. The structure cover, at a minimum, shall be a made of 6-mil greenhouse-grade, UV resistant polyethylene. Center height of structure shall be a minimum of 6 feet. Bow spacing shall be a maximum of 4 feet. All materials shall be of significant thickness to withstand the temperature modification for the period required. To prevent damage from heavy snow loads, tunnel covers shall be removed at the end of the growing season.

The Seasonal High Tunnel System along with necessary appurtenances shall be designed to provide a service life of not less than 4 years.

The Seasonal High Tunnel System structure must be planned, designed, and constructed in accordance with manufacturer's recommendation.

Runoff shall be directed away from the tunnel structure. Where needed, additional practices shall be installed to prevent water runoff from the high tunnels from ponding around or and/or causing other runoff issues. Surface or ground outlets such as rock pads, rock filled trenches with subsurface drains, concrete and other erosion-resistant pads, or preformed channels may be used. Surface and ground outlets shall be sized to ensure adequate capacity. Runoff may be captured and used for irrigation purposes.

Site-specific requirements are listed on the Specifications included in this job sheet are prepared in accordance with the NRCS Field Office Technical Guide. See practice standard Seasonal High Tunnel System (798).