2010

High Tunnel Tulip Production

Linda L. Naeve
Iowa State University, lnaeve@iastate.edu

Bernard J. Havlovic
Iowa State University, bhavlovi@iastate.edu

Leah B. Riesselman
Iowa State University, lriessel@iastate.edu

High Tunnel Tulip Production

Abstract
High tunnels are unheated plastic-covered structures used in the horticulture industry to advance or extend the harvest season of high value crops. In Iowa, these polyethylenecovered structures provide a level of environmental protection between a heated greenhouse and open field production. Without supplemental heat, high tunnels in Iowa will not support annual crop growth and production between November and April, thus most high tunnels are not used during this cold season. In late October 2008, a study was initiated at the ISU Armstrong Research Farm to evaluate the potential of growing tulips as a cut flower crop to fill in this production gap and provide for year-round production in an unheated Iowa high tunnel. A second objective of the study was to control tulip bloom time in a high tunnel through variety selection, planting depth, and row covers.

Keywords
RFR A9102

Disciplines
Agricultural Science | Agriculture

High Tunnel Tulip Production

RFR-A9102

Linda Naeve, Ext. program specialist
Value Added Agriculture
Bernie Havlovic, farm superintendent
Leah Riesselman, agricultural specialist
Armstrong Research Farm

Introduction

High tunnels are unheated plastic-covered structures used in the horticulture industry to advance or extend the harvest season of high value crops. In Iowa, these polyethylene-covered structures provide a level of environmental protection between a heated greenhouse and open field production. Without supplemental heat, high tunnels in Iowa will not support annual crop growth and production between November and April, thus most high tunnels are not used during this cold season. In late October 2008, a study was initiated at the ISU Armstrong Research Farm to evaluate the potential of growing tulips as a cut flower crop to fill in this production gap and provide for year-round production in an unheated Iowa high tunnel. A second objective of the study was to control tulip bloom time in a high tunnel through variety selection, planting depth, and row covers.

Materials and Methods

In 2005, a 30 × 96 ft (2,880 square ft) high tunnel with a 3-ft rib spacing and roll-up side venting was erected at the Armstrong Research Farm with half the area (30 × 48 ft) designated for small fruit production and the other half for annual vegetable production. On October 29, 2008, 1,300 bulbs of 13 tulip varieties were planted following a fall crop of peppers. One hundred bulbs of each variety were planted 4 in. apart in blocks of 25 bulbs/variety/block, in trenches 4 or 6 in. deep. After watering, a polypropylene row cover was hooped over the rows for the first three months to prevent early emergence. This fabric-like material was removed on March 3, when shoot growth was approximately 3 in. tall. The rows were re-covered for three days between March 10 and 13 when low ambient temperatures dropped to 8ºF. Calcium nitrate was applied to the foliage in March at weekly intervals. The tulip plants were harvested, bulbs and all, in the tight bud stage just as they began to show color. The stems were measured, bulbs were removed, and the stems were wrapped, 5 per bunch, in newspaper. The bunches were packed horizontally in boxes and stored at 35°F until they could be delivered to four local floral shops for their use and evaluation.

Discussion and Results

Compared with the 4-in. planting depth, the tulips at the 6-in. planting depth emerged approximately a week later under the row covers. However, the 6-in. planting depth delayed harvest by an average of only three days for the mid-season varieties and one day for the late-season varieties. As expected, the mid-season varieties (Table 1) were harvested an average of seven days before the late-season varieties. A 4-day cold snap in mid March slowed growth by at least a week. There was an average 91% marketable yield among varieties. The bunches were sold to local florists and, when surveyed later, all indicated they were impressed with the quality of the bloom, stem length, and vase life.

This study demonstrates that quality tulips can be grown in a high tunnel in Iowa during the winter months with minimal inputs, filling a production void. To some extent, timing for the spring or Easter market can be controlled

through variety selection and the use of row covers.

It is important to note that the high tunnel used in this study was designed for year-round production. The clear span, Quonset-style high tunnel used in this study is framed with 1.9-in. diameter ribs, made 14-gauge steel tubing, and spaced 3 ft apart to help withstand the snow loads that can occur in Midwest winters.

Acknowledgements

Thanks to the Leopold Center for Sustainable Agriculture for providing funding for this study. Thanks to Farm Tek for donating the high tunnel used in this study and to the Wallace Foundation for Rural Research and Development for its support. Thanks to Dave Breach for assistance in conducting the research.

Table 1. Median harvest dates, average stem lengths and % marketable blooms for 13 tulip cultivars grown in a high tunnel.

		Planting depth (in.)			
		4		6	
Variety	% Marketable bulbs	Median harvest date	Avg. stem length (in.)	Median harvest date	Avg. stem length (in.)
Mid-season					
Pink Impression	89	Mar 24	14.6	Mar 25	16.7
Red Impression	94	Mar 22	14.1	Mar 24	17.4
Bastongne	94	Mar 27	14.4	Mar 30	16.1
Leen van der Mark	89	Mar 26	12.3	Mar 29	13.2
Apricot Parrot	82	Mar 30	14.5	Apr 4	16.5
Late					
Avignon	93	Apr 9	15.7	Apr 8	17.4
Big Smile	91	Apr 2	19.0	Apr 2	21.0
Menton	91	Apr 10	19.0	Apr 11	21.3
Maureen	99	Apr 8	21.0	Apr 7	22.4
Mrs. John T. Scheepers	77	Apr 10	18.2	Apr 10	18.7
Renown	89	Apr 8	19.0	Apr 8	20.2
Violet Beauty	97	Apr 1	14.0	Apr 2	14.6
King’s Blood	93	Apr 6	15.7	Apr 8	15.2