

### Berry Production Under High Tunnels

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"Three-season" high tunnels  
 Southwest Michigan Research & Extension Center, Benton Harbor



### One-Acre Haygrove Tunnels

Initial Investment:

Tunnel frames	\$ 32,200
Poly	\$ 7,000
Construction labor (180 hr @ \$10/hr)	\$ 1,800
	<b>\$ 41,000</b>

Annual costs:

Tunnel frame depreciation (15 yr)	\$ 2,270
Poly depreciation (3 yr)	\$ 2,330
Interest on frame and poly @ 7%	\$ 2,750
Install, vent, and remove poly	\$ 1,200
	<b>\$ 8,550</b>

### Season Extension

#### Strawberries

Short-day and day-neutral

Day-neutral

strawberries	????	strawberries
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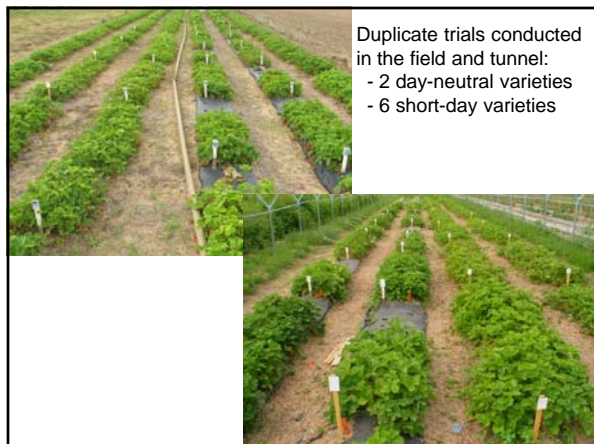
May	June	July	Aug	Sep	Oct	Nov
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raspberries		raspberries	
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Floricanefruiting

Primocanefruiting

#### Raspberries



Duplicate trials conducted in the field and tunnel:  
 - 2 day-neutral varieties  
 - 6 short-day varieties

### Day-neutral strawberry yield and fruit size.

Location and variety	Yield (1000 lb/acre)		Berry weight (g)	
	Fall 2005	Spring 2006	Fall 2005	Spring 2006
<b>Field</b>				
Seascape	14.4	8.2	8.2	7.6
Tribute	18.9	7.2	5.8	7.6
<b>Tunnel</b>				
Seascape	11.3	9.0	7.7	8.4
Tribute	12.9	8.9	5.7	7.2


June-bearing strawberry yield and fruit size, SWMREC, means of 2006 and 2007.

Variety	1000 lb/acre		Berry weight (g)	
	Field	Tunnel	Field	Tunnel
Chandler	11	10	11	12
DarSelect	13	16	11	12
Honeye	12	17	9	9
Jewel	16	18	14	13
L'Amour	12	17	12	12
Ovation	7	7	12	12
<b>AVERAGE</b>	<b>11.8</b>	<b>14.1</b>	<b>11.5</b>	<b>11.7</b>


### Summary - Strawberries

1. Relative variety differences (yield, berry size) are similar in the tunnel and field.
2. Day-neutrals yielded about the same in the tunnel and field. June-bearers yielded a little more in the tunnel.
3. Tunnel berries the same size, slightly less rot.

Jewel - tunnel





Jewel - field



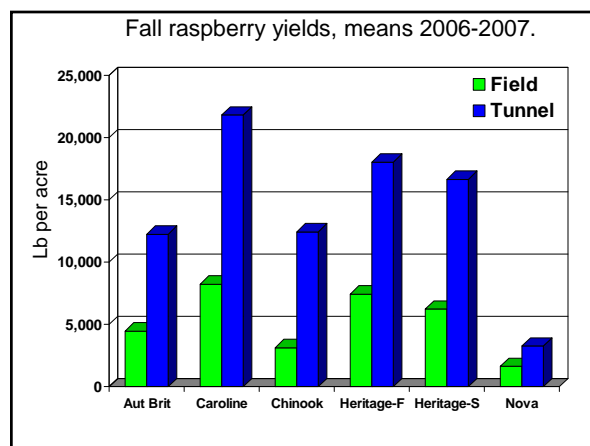
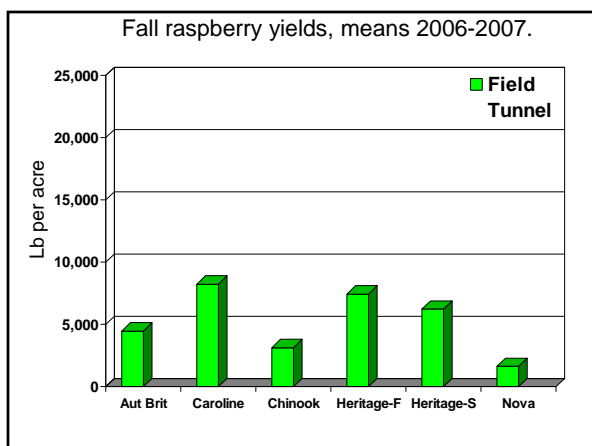
Questions: How valuable is season extension?  
Other varieties, such as Albion?

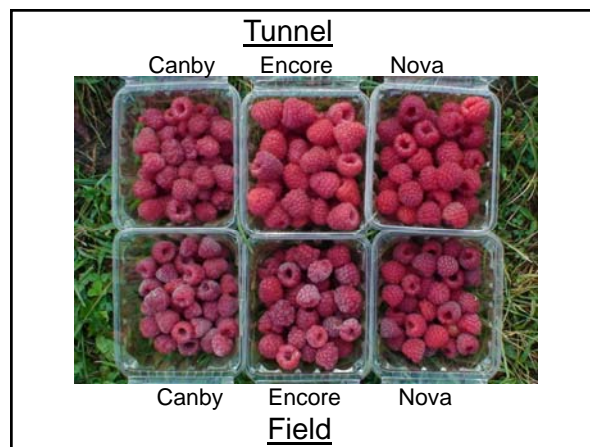
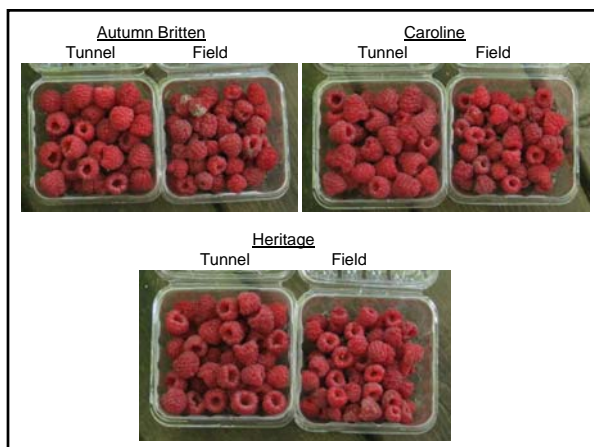
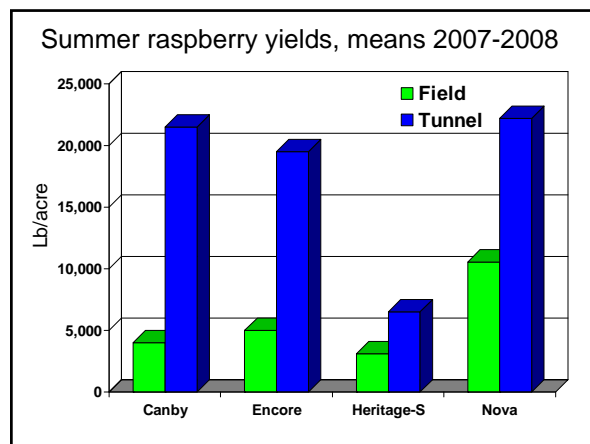
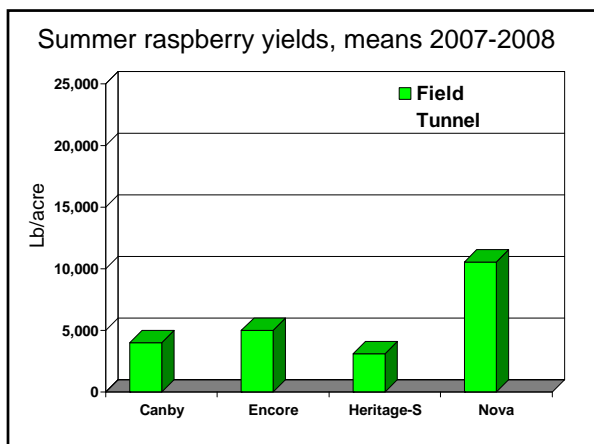
### Raspberries:

duplicate field and tunnel plots planted in 2005

June 14, 2007
June 14, 2007





Berry size and rot incidence of primocane-fruiting raspberries (means of 2006-2007).

Variety	g/berry		Rot (%)	
	Tunnel	Field	Tunnel	Field
Autumn Britten	2.8	2.5	1.4	11.2
Caroline	2.4	1.8	0.7	4.6
Chinook	2.4	2.1	2.5	7.9
Heritage	2.3	1.7	1.6	6.5
Nova	3.3	2.9	--	--
<b>Average</b>	<b>2.6</b>	<b>2.2</b>	<b>1.5</b>	<b>7.6</b>

Berry size (mean 2006-2007) and rot incidence (2007) of summer-fruiting raspberries.

Variety	g/berry		Rot (%)	
	Tunnel	Field	Tunnel	Field
Canby	2.6	2.1	0.8	1.2
Encore	4.3	3.3	0.0	4.0
Heritage	2.1	1.7	0.4	2.4
Nova	3.6	2.8	0.0	2.8
<b>Average</b>	<b>3.2</b>	<b>2.5</b>	<b>0.3</b>	<b>2.6</b>

Bumblebee hives may improved pollination of tunnel raspberries because tunnels discourage honeybees.



**Pests and diseases on raspberries in the field and tunnel, SWMREC (Isaacs and Schilder).**

Pest/disease	Field	Tunnel
<b>Japanese beetle</b> per 10 canes (means of 2006 and 2007)	7.5	2.1
<b>Potato leaf hopper</b> per 5 canes (means of 2006 and 2007)	9.9	1.8
<b>Leaf spot</b> (% leaf area in 2007) (means of 8 varieties)	3.4	0
<b>Anthraxnose</b> (% cane area in 2007) (means of 8 varieties)	0.5	0



**Summary - Raspberries**

1. Relative variety characteristics similar in field and tunnel.
2. Harvest begins earlier and continues later in tunnels.
3. Tunnel yields are 2-3 times field yields.
4. Tunnel berries are 20-25% larger, with much less rot than field-grown berries.
5. Tunnel plants have less anthracnose, leaf spot, Japanese beetle and leaf hoppers, but more spider mites.

**Blackberries (floricane-fruiting)**



Very vigorous tunnels  
 Tests are needed to:  
 - identify best tunnel varieties  
 - quantify yield and berry quality effects  
 - determine if tunnels improve hardiness

Apache Chester Illini Hardy Kiowa



**Blackberries (primocane-fruiting)**



We are testing primocane-fruiting types from the University of Arkansas.

These fruit in Sep and Oct in southern Michigan.

Prime-Jan Prime-Jim APF-40 APF-45 APF-46

