

Hopyard Construction: Budgeting and Economics

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Today's Program

Hopyard Construction: Options

Standard (high) Trellising

Low (short) Trellising (several options)

Hopyard Construction: Costs of establishment for
standard and low trellis systems

Hop Yields: Yield & income comparisons between
standard and low trellis systems and net
returns

Standard Hopyard

- 18' to 20' high
- Plants 7' x 7'
 - 7.5 x 7.5 (Oregon)
- Population: 800
- High labor input
- High production

Standard with Plant Spacing 7.5' x 7.5'

- Tillage both ways
 - More damage
- Furrowing after each weed tillage
- Arching: more labor
- Poles: 15' x 30' spacing

Standard with Center Row Removed

- Larger equipment can be used
- No arching labor
- Better light penetration

Conventional High Trellising

Plant Space 3.5' x 15'

- More light penetration
- Same plant density
- Larger equipment
- Easier, less expensive cultural operations
- Fewer passes, less damage

Plant Spacing 3.5' x 12'

- Seeking maximum or optimum yield in wider spacing
- Using larger equipment may be problematic

Changing Varieties: 3.5' x 15'

- Yards can often be replaced in 20 years
- Varieties may not work as planned
- Changes in market (variety) demand
- Open middle ground assures varietal purity (planting different varieties too close to each other may ruin purity (15 ft recommended))

Standard (High) Trellis Construction

- 21' posts
- 2' to 3' in ground
- Various spacings
 - 14' x 42'
 - 15'x 30'
 - 30' x 30'
- Equilateral triangle at end posts
 - 15' base
- Poles connected within rows only
- Top training wire is free floating

- Steel Anchor Embedded in Concrete
 - New auger type anchors (not for sandy soils)
- Wire Clamp for Anchor Wire
- Clamping Cable
- Corner end with triple anchors

Hop Growth on High Trellis

- Coir twine is tied to clip placed in soil next to hill
- Twine is tied to top wire
- Trained hop vine winds its way to top
- Harvesting: cuts top and bottom and remove for picking & processing

Low Trellis Systems: 3' x 8', 9.3', or 12'

- Lower cost of establishment
- Labor reduction
- May be better for small farms due to labor availability
- Lower per acre yields
- Ill adapted varieties*

New Planting in Washington state

- Approx. 800 acres of new low trellis systems in Washington
- May need specialized equipment or adaptation
- Methods not thoroughly tested

Low Trellis Construction

- Equilateral triangle on row ends
- Somewhat lighter wire needed
 - 16 gage top high tensile wire
 - 12 gage bottom
- can be as tight as 3' x 9' plant spacing
- up to 1613 plants per acre can somewhat compensate for lower yields

Top Wire on Low Trellis

- Top wire at 10'
- Mesh netting at 10'

Bottom Wire on Low Trellis

- Bottom wire 12" up
- Bottom of netting
- Carries drip tubing
- Attached with compression clamp

End Bracing on Low Trellis

Plastic Mesh Netting

- 12" Mesh spans 9'
- UV protected, has a 10 year life
- Reinforced by plant vines
- Vine removal is contemplated but not necessary
 - Equipment is now in design stage

Vines Climb Each Vertical Strand

Multiple Vines per Vertical Strand

- 3-4 vines per strand by 2nd year
- Bines and some arms remain after stripping process
- Previous vines support next crop

Zeus and Willamette Comparison

- Growth habits differ
 - Willamette is early and flowers on top
 - Zeus is later and flowers uniformly
- Research is now on to find dwarf hops*

Irrigating Hops

Hopyard Standard Trellis Establishment Cost per Acre

Rhizomes (4' x 12')	1040	\$ 1260
Misc. Hardware & Supplies		\$ 1260
Poles (21' untreated, lodge pole pine)	52	\$ 1070
D5 Dozer Work		\$ 600
Bob Cat & Auger (holes for poles)		\$ 550
7-Strand Wire (carries floating wires)		\$ 800
#9 Wire (floating – top wire)		\$ 250
Hop Twine (coir: coconut husk fiber)		\$ 140
48" Ground Anchors	48	\$ 400
<u>Drip Irrigation Materials</u>		\$ 1500
30 hrs. Tilling		\$ 300
40 hrs. Pole Setting		\$ 400
Gallows (for work on top wires)		\$ 140
Labor		\$ 3750
Total Establishment Cost		\$ 12,420

Data Courtesy of Glen Fuller
(Colorado)

Low Trellis Establishment Cost

LOW TRELLIS ESTABLISHMENT COST PER ACRE (9')

Item	Comment	Cost/Acre
Poles	162 at \$8.80/pole	\$ 1,426
Top cable	5000 ft	\$ 375
Bottom wire	5000 ft	\$ 100
Top staple	175 (top) 162 (bottom)	\$ 16
Cable clamps	15	\$ 5
Anchors	\$20 (steel, cable, concrete, labor)- 4.5/acre	\$ 90
Netting	4840 ft	\$ 980
TOTAL MATERIALS		\$ 2,992
Ground prep		\$ 125
Potted plants	\$0.65 / plant / 1614 pots per acre	\$ 1,050
Irrigation		\$ 1,000
Fuel		\$ 20
Labor		\$ 823

TOTAL ESTABLISHMENT COST PER ACRE \$ 6,010

Data Courtesy of Roy Farms/Jason Perrault

Annual Low Trellis Growing Cost

Low Trellis Growing Costs

	Year 2 2006	Year 3 2007	Standard
Ground Work	\$ -	\$ 60	
Training/Weeding	\$ 953	\$ -	
Down Vines	\$ -	\$ -	
Harvest	\$ 300	\$ 300	
Bug Spray	\$ 174	\$ 111	
Fungicide	\$ 21	\$ 30	
Foliar	\$ 24		
Fertilizer	\$ 80	\$ 154	
Broken Wires	\$ -	\$ 51	
Other	\$ 28	\$ 28	
Total	\$ 1,580	\$ 734	\$ 1,700

Difference (Std-07): \$ (966)

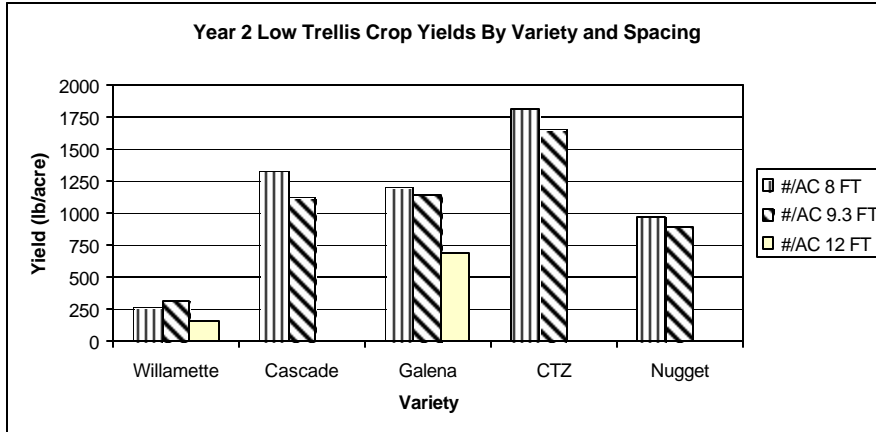
% Difference: -57%

Data Courtesy of Roy Farms/Jason Perrault

LOW TRELLIS HOP YIELD YEAR 2

VARIETY	#/AC 8 FT	#/AC 9.3 FT	#/AC 12 FT	Difference
				8'-9'
Willamette	265	315	160	50
Cascade	1327	1124		-203
Galena	1206	1144	694	-62
CTZ	1825	1659		-166
Nugget	980	893		-87

Note: 12' CTZ and Nugget were not harvested due to timing and lack of growth.



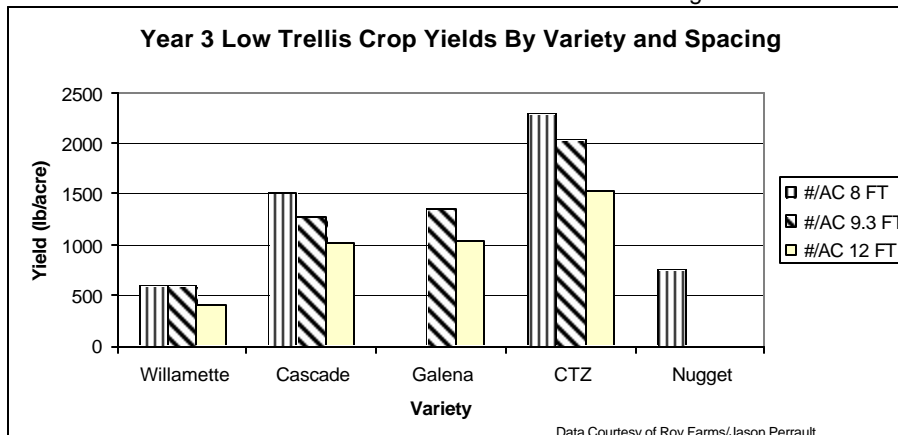
Data Courtesy of Roy Farms/Jason Perrault

LOW TRELLIS HOP YIELD YEAR 3

VARIETY	#/AC 8 FT	#/AC 9.3 FT	#/AC 12 FT	Difference
				8'-9'
Willamette	600	600	400	0
Cascade	1520	1280	1020	-240
Galena		1360	1040	1360
CTZ	2298	2043	1532	-255
Nugget	760			-760

Note: 8' Galena was not harvested due to machine breakdown.

9.3', 12' Nugget were not harvested due to timing.



Data Courtesy of Roy Farms/Jason Perrault

LOW TRELLIS HOP YIELD YEAR 3

VARIETY	#/AC 8 FT	#/AC 9.3 FT	#/AC 12 FT	Standard	
Willamette	600	600	400	1318	Assumptions: Total Costs (Conv.): \$ 4,000 Variable Costs Savings: \$ 966 Total Costs (LT): \$ 3,034
Cascade	1520	1280	1020	2031	
Galena		1360	1040	1776	
CTZ	2298	2043	1532	2712	
Nugget	760			1909	

LOW TRELLIS COST PER UNIT (GROWING COSTS)

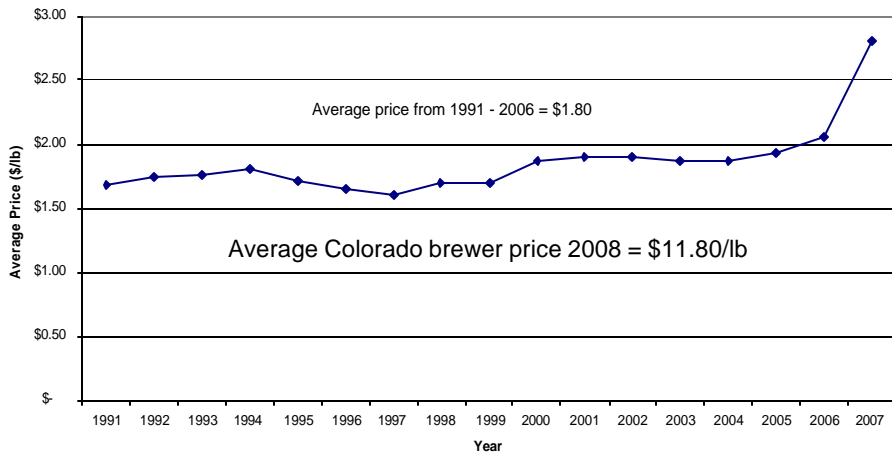
VARIETY	#/AC 8 FT	#/AC 9.3 FT	#/AC 12 FT	Standard	Difference (8'-Standard)	% Difference (Growing Costs)
Willamette	\$ 1.22	\$ 1.22	\$ 1.84	\$ 1.29	\$ (0.07)	-5%
Cascade	\$ 0.48	\$ 0.57	\$ 0.72	\$ 0.84	\$ (0.35)	-42%
Galena		\$ 0.54	\$ 0.71	\$ 0.96	\$ (0.42)	-44%
CTZ	\$ 0.32	\$ 0.36	\$ 0.48	\$ 0.63	\$ (0.31)	-49%
Nugget	\$ 0.97			\$ 0.89	\$ 0.08	8%

LOW TRELLIS COST PER UNIT (TOTAL COSTS)

VARIETY	#/AC 8 FT	#/AC 9.3 FT	#/AC 12 FT	Standard	Difference (8'-Standard)	% Difference (Growing Costs)
Willamette	\$ 5.06	\$ 5.06	\$ 7.59	\$ 3.03	\$ 2.02	67%
Cascade	\$ 2.00	\$ 2.37	\$ 2.97	\$ 1.97	\$ 0.03	1%
Galena		\$ 2.23	\$ 2.92	\$ 2.25	\$ (0.02)	-1%
CTZ	\$ 1.32	\$ 1.49	\$ 1.98	\$ 1.47	\$ (0.15)	-10%
Nugget	\$ 3.99			\$ 2.10	\$ 1.90	91%

Data Courtesy of Roy Farms/Jason Perrault

Season Avg Price of Hops (U.S.)



source: NASS; Colorado Brewers Survey (Hamm; 2008)

