


Organic Blueberry Production – Is it viable in the Northwest?
A report on on-going research


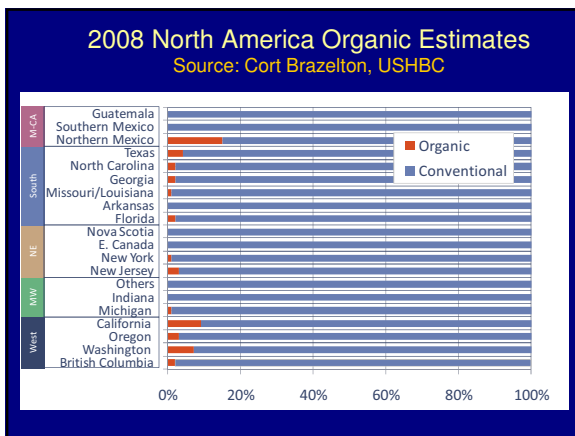
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 Oregon State University, Corvallis, Oregon



OSU
 Oregon State University
 Planting 5-21-08


A. Planting Method

- 1) Raised bed
- 2) Flat ground

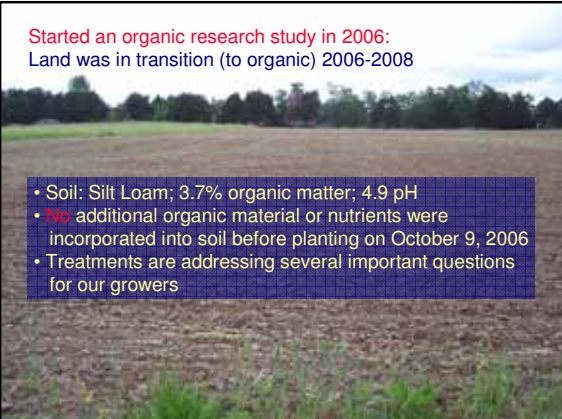
B. Organic fertilization type and rate

- 1) Feather meal (29 or 58 kg N/ha)
 ½ applied March/April
 ½ applied April/May



- 2) Fish emulsion (29 or 58 kg N/ha)
 divided into 7 equal applications
 applied as a liquid, soil drench
 every 2 weeks from April – July

Started an organic research study in 2006:
 Land was in transition (to organic) 2006-2008




- Soil: Silt Loam; 3.7% organic matter; 4.9 pH
- **No** additional organic material or nutrients were incorporated into soil before planting on October 9, 2006
- Treatments are addressing several important questions for our growers

Fertilizers used

Fish emulsion:
 "Fish Agra" (Northeast Organics Inc.)
 pH 3.7; EC 20.4 dS/m; 4% N; 1% P₂O₅; 1% K₂O;
 0.8% Ca; 1.7% S; 800 ppm Mg; 29 ppm Zn; 76 ppm Al;
 54 ppm Cu; 327 ppm Fe; 5 ppm Mn; 2.5 ppm B

Feather meal:
 Nature Safe (Cold Spring, KY)
 pH 5.7; EC 1.7 dS/m; 13% N; 0% P₂O₅; 0% K₂O;
 2% Ca; 1.3% S



C. Cultivar

- 1) Duke
- 2) Liberty

'Duke'

'Liberty'

Between rows:
Edge of grass cover crop managed using 20% acetic acid and mowing

D. Weed management

- 1) Sawdust mulch + hand weeding
- 2) Compost + sawdust mulch + acetic acid (vinegar, 20%), flaming (burning with propane) & hand weeding, if needed
- 3) Weed mat with sawdust around plants & hand weeding

April 5, 2007

Experimental design:

Plants are at 0.9 m x 3 m between rows (4,385 plants/ha)
Single line drip (emitters at 30cm; 1.9 L/h)
extra drip line to provide extra water in weed mat plots, if needed
Planting is 0.4 ha in size

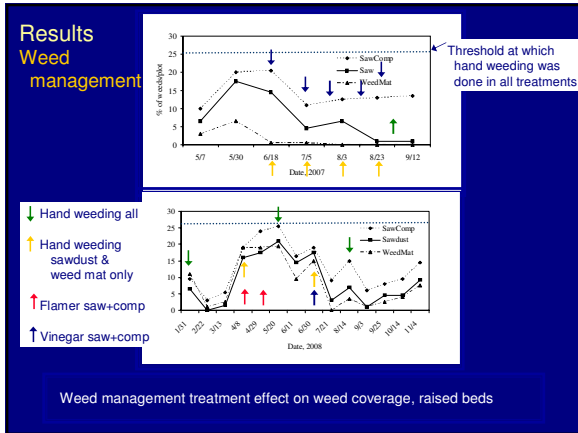
Planting 5-21-08

Fir sawdust \$7.80/m³ (fall 2006)

Yard debris compost \$11.27/m³

pH:	4.2	pH:	7.3
C:N ratio:	44:1	C:N ratio:	21
N (%):	0.1	N (%):	1.1
P (ppm):	255	P (ppm):	2356
B (ppm):	2.1	B (ppm):	7.8
Mn (ppm):	61	Mn (ppm):	540

The planting was certified organic by Oregon Tilth, May 2008



Weed management treatment costs (Materials + Labor):

Sawdust

Flat: \$3830/ha
 Raised: \$4497/ha

Weed mat

Materials (amortized 5 years) \$2965/ha = \$593/year
 Installation: \$680/ha
 Cutting holes: \$865/ha
 Sawdust, material + install: \$927/ha
TOTAL: \$3065/ha

Compost + Sawdust

Flat: \$4806/ha
 Raised: \$5654/ha

Planting costs:

Into weed mat: \$0.70/plant
 Other mulched plots: 0.40/plant
 Weed mat added cost: \$1292 /ha



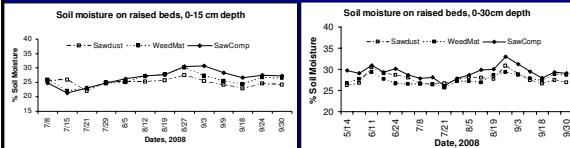
Weed management treatment costs:

Year 1:
 Sawdust (hand weed only): 17 hours/ha
 Compost + Sawdust:
 5 applications of acetic acid: 64 hours/ha + \$250 product/ha
 hand weeding in cooler months: 7.5 hours/ha
 Weed mat (hand weed around plants): 5 hours/ha

Year 2:
 Sawdust (hand weed only): 47 hours/ha
 Compost + Sawdust:
 1 application of acetic acid: 15 hours/ha + \$50 product/ha
 2 flaming treatments: 25 hours/ha + propane cost
 hand weeding: 37 hours/ha
 Weed mat (hand weed around plants): 20 hours/ha



Soil Moisture, 2008



Effect of weed mat, sawdust mulch, and sawdust + compost mulch on percent soil moisture of raised beds at 2 depths, 2008

Plots were irrigated to maintain adequate soil moisture across treatments.

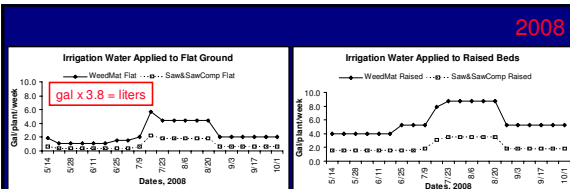
Fertilization

2007



Leaf tissue N = 1.1 to 1.5%

'Liberty', 6-27-07, sawdust, feather meal, 29 kg N/ha



Effect of weed mat, sawdust mulch, and sawdust + compost mulch on irrigation requirement of flat ground & raised beds, 2008

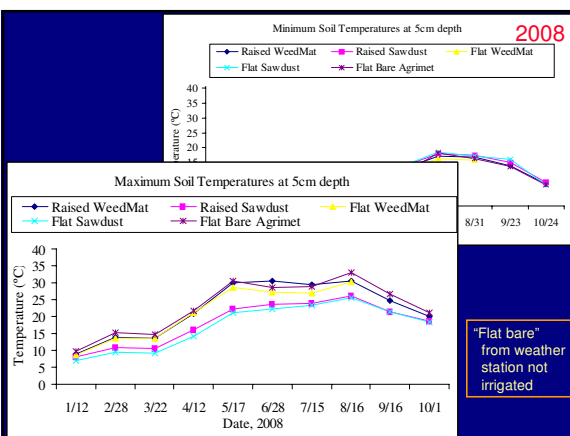
Raised beds with weed mat required additional 300 L/plant water through 2008 (May 14 to Oct. 1) than did mulched beds, on average

Raised beds required 190 L/plant more irrigation than flat ground, on average



Leaf tissue N = 2.3 to 2.8%

'Liberty', 6-27-07, fish fertilizer at 58 kg N/ha



Fertilization (year 1):

2007

Feather meal (29 or 58 kg N/ha)
 1/2 applied 3 April 2007
 1/2 applied 16 May 2007

PLUS

Fish emulsion applied as soil drench (3.8 kg N/ha) on each of 28 June and 5 July





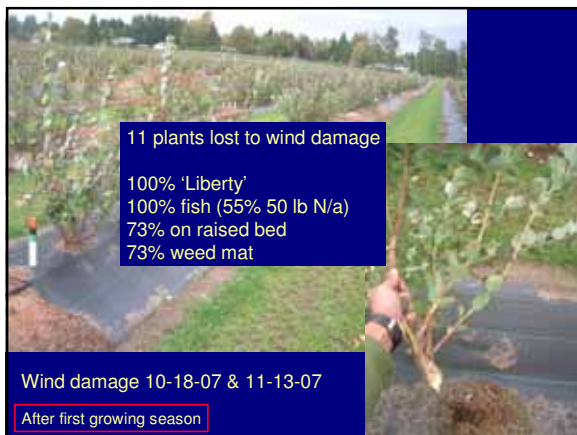
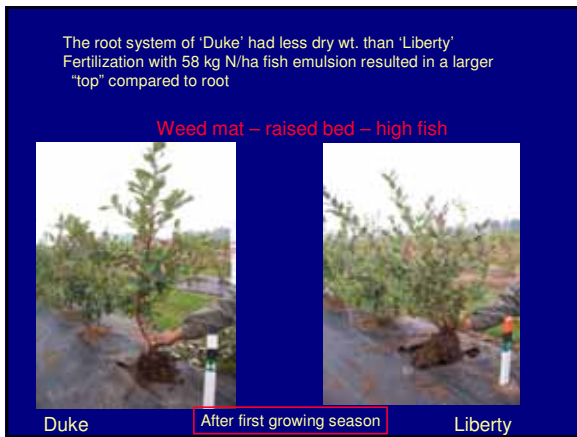
SUMMARY OF COSTS, ESTABLISHMENT & YEAR 1

Total economic costs for year 0 + year 1 for 'Duke' fertilized with 50 kg N/ha:

Planting system	Mulch type	Fertilizer type	Cost of production (\$/ha)
Flat	Sawdust	Feather meal	\$30,311
Flat	Compost + Sawdust	Feather meal	\$32,807
Flat	Weed mat	Feather meal	\$30,704
Flat	Sawdust	Fish emulsion	\$31,444
Flat	Compost + Sawdust	Fish emulsion	\$33,940
Flat	Weed mat	Fish emulsion	\$31,837
Raised	Sawdust	Feather meal	\$31,726
Raised	Compost + Sawdust	Feather meal	\$34,401
Raised	Weed mat	Feather meal	\$31,483
Raised	Sawdust	Fish emulsion	\$32,859
Raised	Compost + Sawdust	Fish emulsion	\$35,534
Raised	Weed mat	Fish emulsion	\$32,616

- Costs ranged from \$30,311 to \$35,534 per ha
- Cost differences between treatments may change as planting matures
- Although we used custom costs for many practices, costs will likely be impacted by improved efficiencies when done on a larger scale by commercial growers

21, 2007





Yield was significantly affected by cultivar, growing on raised bed compared to flat ground, mulching method, and fertilizer

Table 1. Effect of organic production systems on yield and fruit quality on the second year after planting, June - August 2008, NWREC (n=5) (mean ± SE).

Treatments	Plant yield and fruit quality		
	Yield (g/plant)	Berry weight (g)	Firmness (g.mm ⁻¹ of deflection)
Main effects			
Flat	289 ± 18.8	2.0 ± 0.0	194 ± 2.8
Raised	→ 399 ± 18.6	2.2 ± 0.0	195 ± 2.8
25Feather	264 ± 20.0	2.1 ± 0.0	183 ± 2.6
25Fish	→ 457 ± 19.8	2.2 ± 0.0	198 ± 2.6
50Feather	309 ± 20.2	2.1 ± 0.0	191 ± 2.6
50Fish	345 ± 19.9	2.1 ± 0.0	→ 204 ± 2.6
SawdustComp	358 ± 15.4	2.1 ± 0.0	196 ± 2.3
Sawdust	282 ± 15.5	2.1 ± 0.0	195 ± 2.4
WeedMat	→ 392 ± 15.3	2.1 ± 0.0	→ 191 ± 2.3
Duke	283 ± 13.9	2.2 ± 0.0	→ 215 ± 2.3
Liberty	→ 404 ± 13.7	2.1 ± 0.0	173 ± 2.3





SUMMARY – YEARS 1 AND 2:

- Raised beds better so far – even on good soil (better growth and yield)
- Raised beds need more irrigation (even without incorporation of sawdust before planting)
- Weed mat increased top growth and yield, but increased irrigation requirement
- Weed mat advanced season in Duke, not Liberty
- Weeds were least on weed mat and most on compost + sawdust
- We confirmed that young plants do not need much fertilizer nitrogen in our soil (29 kg N/ha fish emulsion was best)
- Fish fertilizer was quickly available to plants, but high cost
- Feather meal not as good, to date, as fish – trying earlier application now
- Fertilizer seems to affect fruit quality

