

What Can I Do Without and Still Produce a Good Crop?

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Have we really been wasteful?

- Have we:
 - Applied too much fertilizer?
 - Applied the wrong type of fertilizer?
 - Sprayed too many fungicides?
 - Sanded too many beds?
 - Wasted fuel by watching too much frost?!!

THE REAL QUESTION

What can I (as a field manager) do to maximize profitability?

MAXIMUM PROFITABILITY

Equals

HIGHEST YIELDS + MINIMUM COSTS

Costs controlled by a field manager

- Fertilizers
- Insecticides
- Spring Herbicides
- Fungicides
- Roundup
- Pollination

How can we minimize costs on our property?

1. Set up a Budget for the Season
2. Scrutinize every input

- How much does it cost?
- How much benefit do I get from the use of this product?

The Profitability of a Cultural Practice
is
based on Yield Response

Gather Information
Test the Product

Gather as much information as
possible

Talk with other Growers
University personnel
Text Books and Technical Manuals
Chemical / Fertilizer suppliers
Private Research Organizations
Read books and magazines

Test the Product Yourself

NEVER ASSUME

QUESTION AUTHORITY

Find out how the product works on your
property in your particular situation.

Example: We want reduce fertilizer
costs by switching from manufactured
to blended fertilizers

- What do we know about the products?
- What are the benefits?
- What are the drawbacks?
- What are the risks?
- Is there any hidden expense?
- If used successfully, where is the proof?

Results from the field tests

- Saved \$5.00 per acre throughout the season
- Poor distribution from the boom
- Highly variable particle size
- Product separated, causing streaks in field
- Yields dropped 9.8 % due to over and under fertilization within the bed
- Yield loss cost us \$920 / acre.

Frequently Asked Question

How do I set up a useful experiment in my field?

Not difficult, but proper setup is crucial.

Setting up a field experiment

Initial Question:

Will my cranberry beds benefit from a spring gypsum application?

From our initial investigation

- Advantages
 - Excellent source for calcium additions
 - Will not influence soil pH levels
 - soluble in water, so readily available
- Disadvantages
 - Displaces Mg and K in the soil system
- Cranberry Myth
 - Greatly improves water penetration in poorly drained beds

Additional questions to consider

- Do I need additional Calcium?
 - Determine needs with a soil test
- Will the additional calcium increase my need for additional potassium and magnesium?
 - Implement a soil testing program
- Will a gypsum application influence my yield?
 - Develop a field test to find the answer

Lay out Experiment Properly

- Conduct the test using your own production equipment.
- Make the plots big enough to view results
- Perform test on only one side of a uniformly producing bed
- Replicate the rates

Gypsum Field Test

- Rates to Test:
 - 0, 100, 200, 400 lb. / acre
- Location:
 - East side of bed 1
- Plot size:
 - Entire boom width, change rate every 2-3 sprinklers
- Replication
 - 0, 100, 200, 400, 0, 100, 200, 400

Quantify Your Results

- In each plot, answer these questions...
 - Differences in current season yield?
 - Differences in berry size?
 - Differences in number of berries per upright?
 - Differences in plant color, vigor?
 - Differences in yield the next season?
 - Any other responses to the application?

Potential Studies for your consideration

Assess the need for Additional Potassium Applications at fruitset

How does an application of Potassium Chloride (0-0-62) influence:

- Berry Size?
- Re-bloom?
- Bud Set?
- Yields?
- Vine Hardening?

Potassium Chloride on Producing Beds

- Stevens bed averaged 199 bbl / acre
- Applied a single application on July 14, 1998
 - 0 lb / acre
 - 300 lb / acre
 - 450 lb / acre
 - 600 lb / acre
- Replicated 4 times
- Put on with a boom

Potassium Chloride on Producing Beds

- Checked for Re-Bloom on August 21st
- No difference in the average number of flowers
 - Re-bloom averaged 1 flower / 4 sq. ft.
 - 11,000 flowers per acre
 - (300 lb. of berries per acre)



% Re-bloom from 0-0-62 Applications

Lb. per acre 0-0-62	Avg. # flowers
0	48.3
300	44.3
450	45.8
600	35.3
Significance	NS

Potassium Chloride on Producing Beds

- Tissue Samples showed high nitrogen levels for mid-July when numbers should be 1.4%.
- Very high nitrogen levels usually give high potassium concentration in the tissue at this time (0.7-0.8%)

Mid-July Tissue Concentrations

Bed	[Concentration in %]							[Concentration in parts per million]						
	N	P	K	Mg	Ca	S	Fe	Mn	B	Cu	Zn	Al		
44-7	2.02	0.20	0.84	0.22	0.88	0.18	211	443	40	16	101	70		
44-8	1.60	0.15	0.70	0.22	0.94	0.17	213	570	43	10	34	50		
44-9	1.70	0.15	0.69	0.20	0.87	0.15	180	571	36	12	36	41		
44-10	1.57	0.16	0.71	0.21	0.79	0.16	191	475	40	18	49	63		

Potassium Chloride on Producing Beds

- How did the 0-0-62 affect Yield?
- This product was put on after fruitset and berries were beginning to size.
- We saw a reduction in yield as 0-0-62 rates increased.

Effect of 0-0-62 on Yield

Pounds per acre 0-0-62	Average Wt. per Berry (grams)	% Yield Reduction
0	1.44	0.00%
300	1.38	4.17%
450	1.30	9.72%
600	1.18	18.06%
Significance	**	**

Potassium Chloride on Producing Beds

- Where does this lead us?
 - No effect on re-bloom
 - yield loss as rates increase
- Avoid the desire to apply high rates of 0-0-62 to influence crop culture

2nd part of the Question

Can 0-0-62 slow runner growth, harden off runners and cause uprights to break on runners?

Using 0-0-62 on Cranberry Beds

- Mowed bed in Spring.
- Applied weekly fertilizer until Early July
- High internal N levels, and needed to slow down vines for production next season.
 - Mid-July Tissue Samples of 1.8% N
- Applied 0-0-62 on July 15, 1998

Rates of 0-0-62 Evaluated

	July 15th lb. / acre Application 0-0-62	July 28th lb. / acre Application 0-0-62	Total lb. / acre Application 0-0-62
Treatment 1	150	.	150
Treatment 2	300	.	300
Treatment 3	450	.	450
Treatment 4	600	.	600
Treatment 5	150	150	300
Treatment 6	300	300	600
Treatment 7	450	450	900
Treatment 8	600	600	1200
Treatment 9	2400	.	2400

Results from using 0-0-62 on cranberry beds

- Areas which received 900 to 1200 lb / acre had darker green color
 - Only Uprights (blue-green color)
- The area which received 2400 lb / acre was nearly dead.

Using 0-0-62 on Cranberry Beds

- Tissue Test Results:
 - No difference in tissue N concentration but very high potassium (>1.0% K)
 - No difference between nutrient concentration of uprights and runners

Using 0-0-62 on Cranberry Beds

- Did the 0-0-62 harden off the vines?
- 18-Aug-98 Sampled each treatment
- Measured length of “red” on runner
- No Difference. Each treatment had 8” of “red” color.

Using 0-0-62 on Non-Productive Cranberry Beds

- Did the potassium stay in the soil?
- Three weeks after the application, potassium levels in the soil were the same as when we started.
 - 150 lb 0-0-62 added 77 lb. K
 - 1200 lb. 0-0-62 added 617 lb. K

Using 0-0-62 on Cranberry Beds

- Was hardening off different in September?
- On Sept. 18th
 - No “red” remaining in the runners
 - All appeared to harden off at same rate
 - No upright color differences in plots
 - Tissue concentrations same for plots

Using 0-0-62 on Cranberry Beds

What do we do with these results?

- 0-0-62 didn't slow down vine growth
- Potassium wasn't in soil for a long time
- Hardening off not affected.
- Similar bud development % but size was smaller.

Where should we Look to Maximize our Yields?

(Or, alternatively, determine what is currently limiting our yields)

“My” Yield Limiting Factors in Cranberry Production

- Soil Moisture Levels
- Rates and timing of fertilizers
- Unnecessary use of herbicides
- Poor boom uniformity
- Irrigation Uniformity

What is the effect of irrigation uniformity on yields?

- Selected one bed of Stevens
 - Average yield 239 bbl / acre
- Poor Irrigation Uniformity Coefficient
- Took berry weight and yield
 - System applied too much water
 - System applied optimal moisture

Results: Effect of moisture on yields

- **Berry Weight** (mid-August)
 - Excess irrigation 1.05 grams / berry
 - Good irrigation 1.21 grams / berry
- **Yields** (October)
 - Excess irrigation 182 bbl / acre
 - Good irrigation 297 bbl / acre