



University of
Massachusetts
Amherst

Research Update Meeting 2006 - Sanding Research 2005 Physiology and Insect Control

Item Type	article;article
Authors	Sylvia, Martha
Download date	2026-06-11 23:27:15
Link to Item	https://hdl.handle.net/20.500.14394/8790

Sanding Research 2005

Physiology and Insect Control



Martha Sylvia & Michelle Botelho
Cranberry Station, UMass Amherst

Natural Sanding



- Most commonly used cultural practice
- First practice used in cultivating cranberry
- Henry Hall noticed beneficial effect in Dennis in 1816

Why Sand?

- Promote growth
- Improve overall productivity
- Suppress disease
- Reduce insect populations
- Act as a pruning mechanism

1/2"-2" every 2-5 years



Sanding

- Covers the runners
 - Anchors runners
 - Encourages uprights
 - Encourages rooting
- Stimulates organic matter decomposition
 - Free fertilizer!
 - Nitrogen release!
 - Use less fertilizer in sanding year

Sanding

- Buries the trash layer
 - Suppress fruit rot inoculum
 - Limits girdler habitat and slow infestations

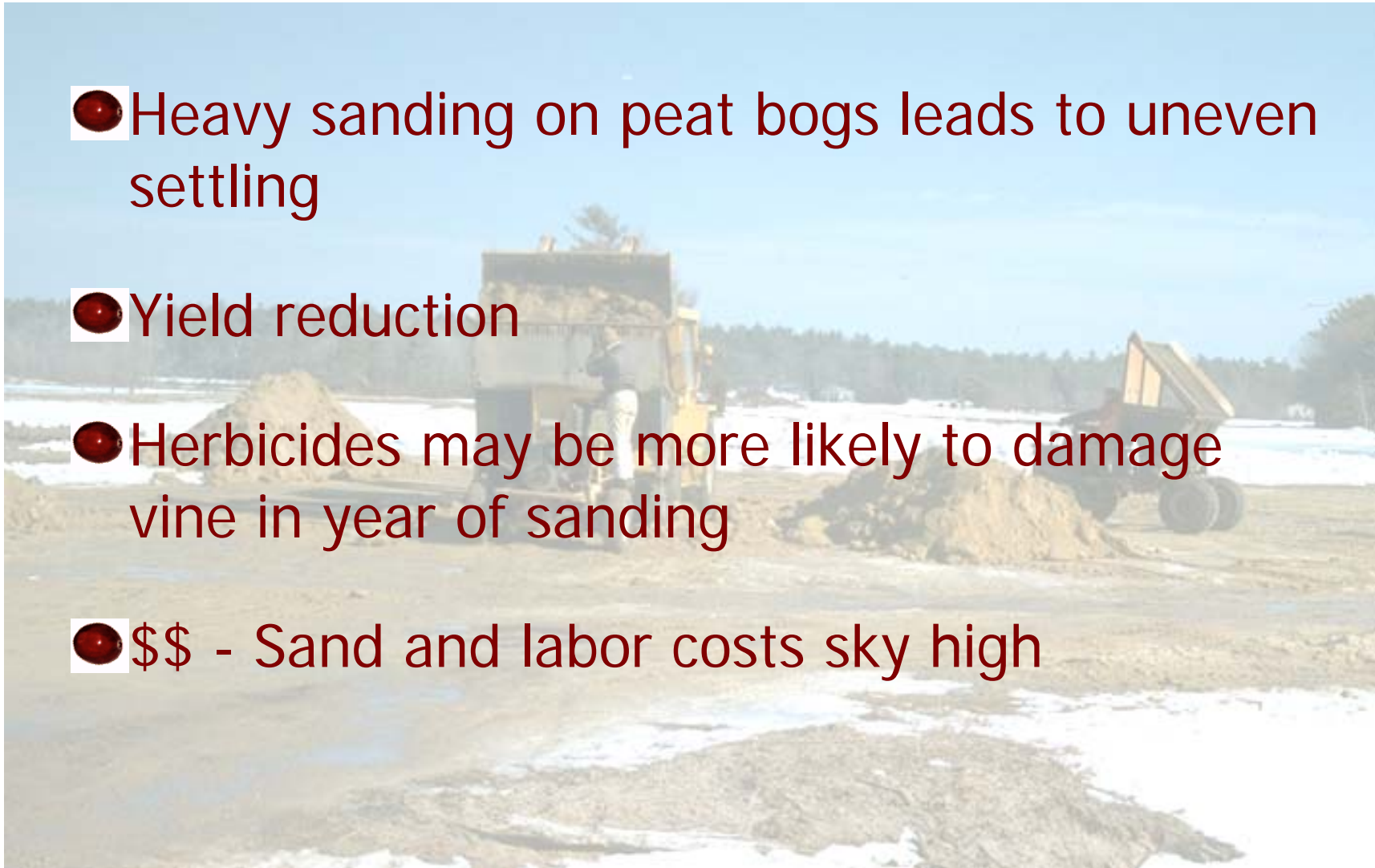


Sanding on New Plantings

- Anchor runners
- Encourages rooting
- 1/2" at least in first or second year

Sanding Negatives

- Heavy sanding on peat bogs leads to uneven settling
- Yield reduction
- Herbicides may be more likely to damage vine in year of sanding
- \$\$ - Sand and labor costs sky high

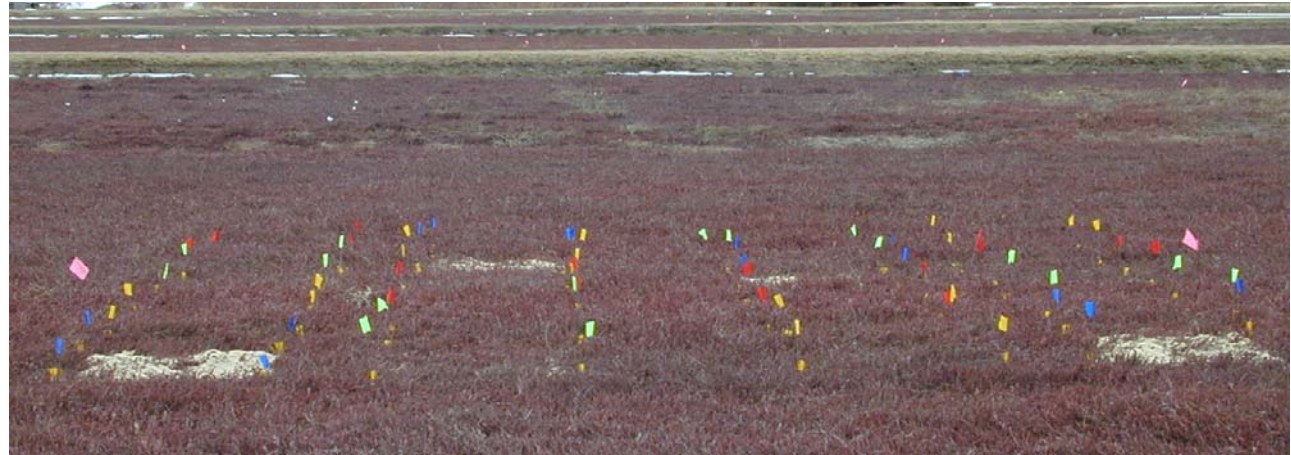


Sanding - Physiology

- 2 cultivars sanded at State Bog
 - Early Black
 - Stevens
- Estimated plant density
- Yield
- Fruit color test - TAcY values
- Flooding interaction - CHO analysis

Sand Application 3/23/05

Stevens



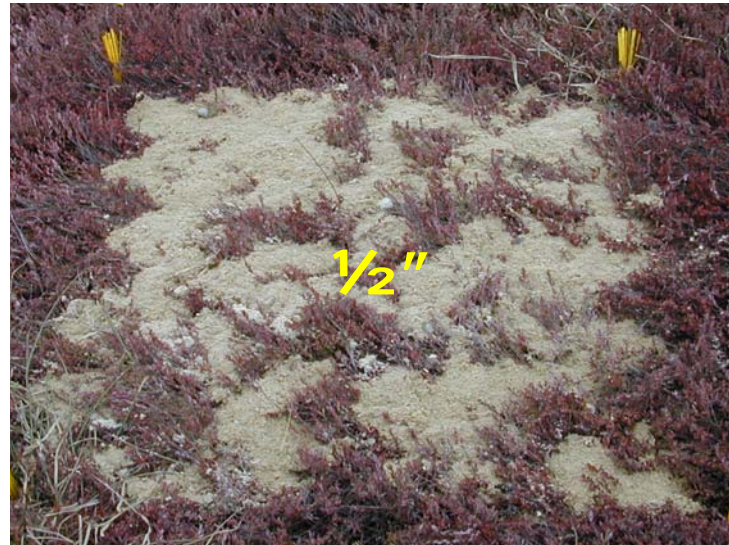
Early Black



Stevens 3/23/05



Early Black 3/23/05



Plant Density - Stevens

March 23 – sand applied



0"



1/2"



1"



1 3/4"



May 5 – six wks after sanding

Plant Density - Stevens

March 23 – sand applied



0"



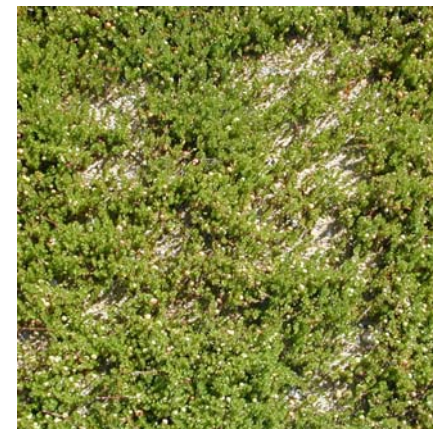
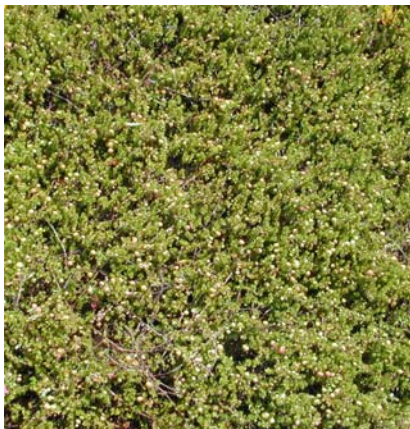
1/2"



1"



1 3/4"



July 29 – 18 wks after sanding

Plant Density - Early Black

March 23 – sand applied



0"



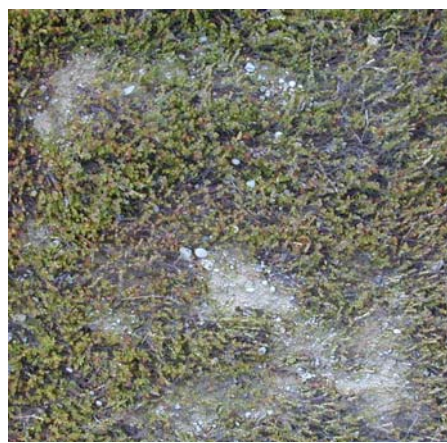
1/2"



1"



1 3/4"



May 5 – six wks after sanding

Plant Density - Early Black

March 23 – sand applied



0"



1/2"



1"

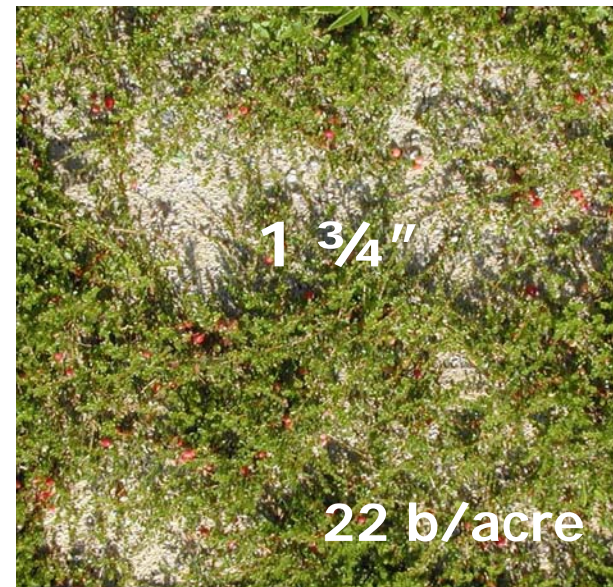
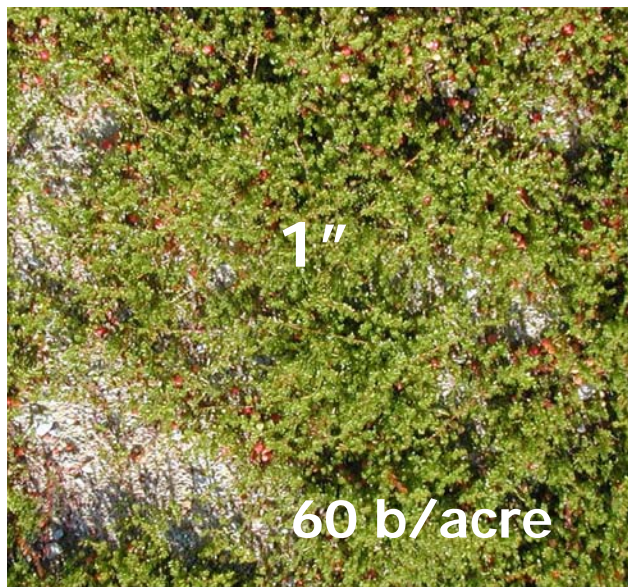
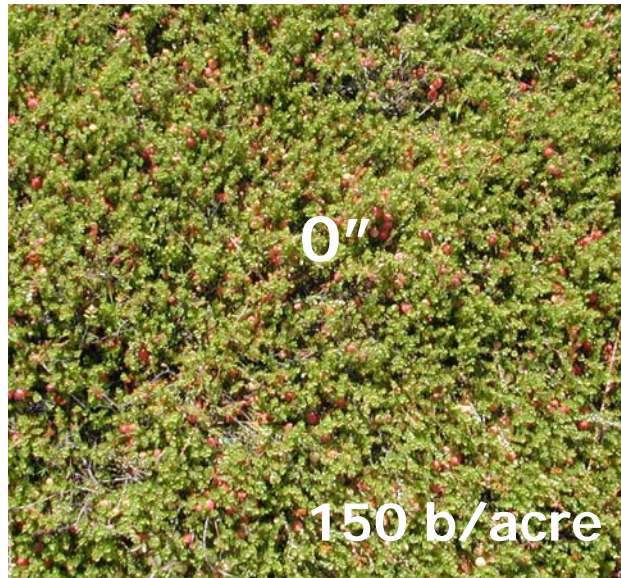


1 3/4"

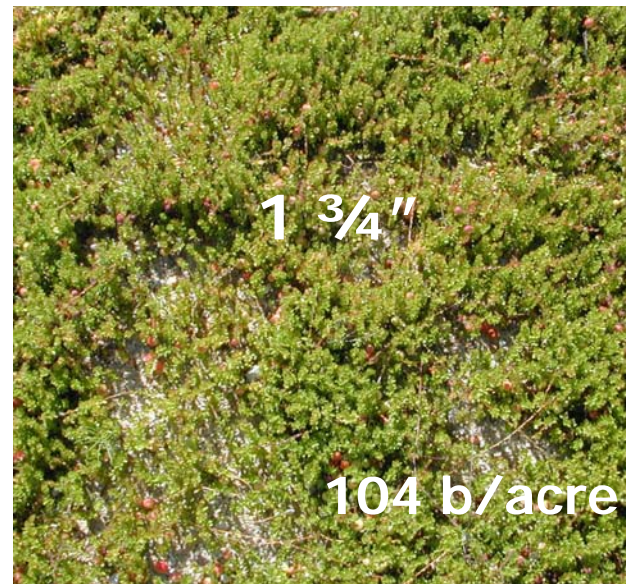
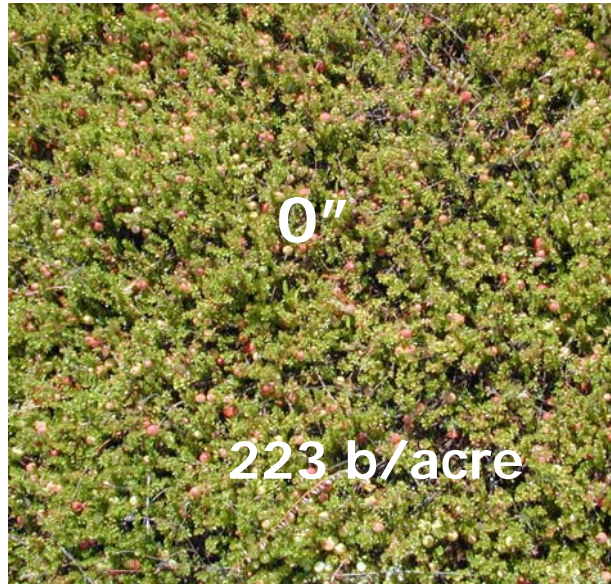


July 29 – 18 wks after sanding

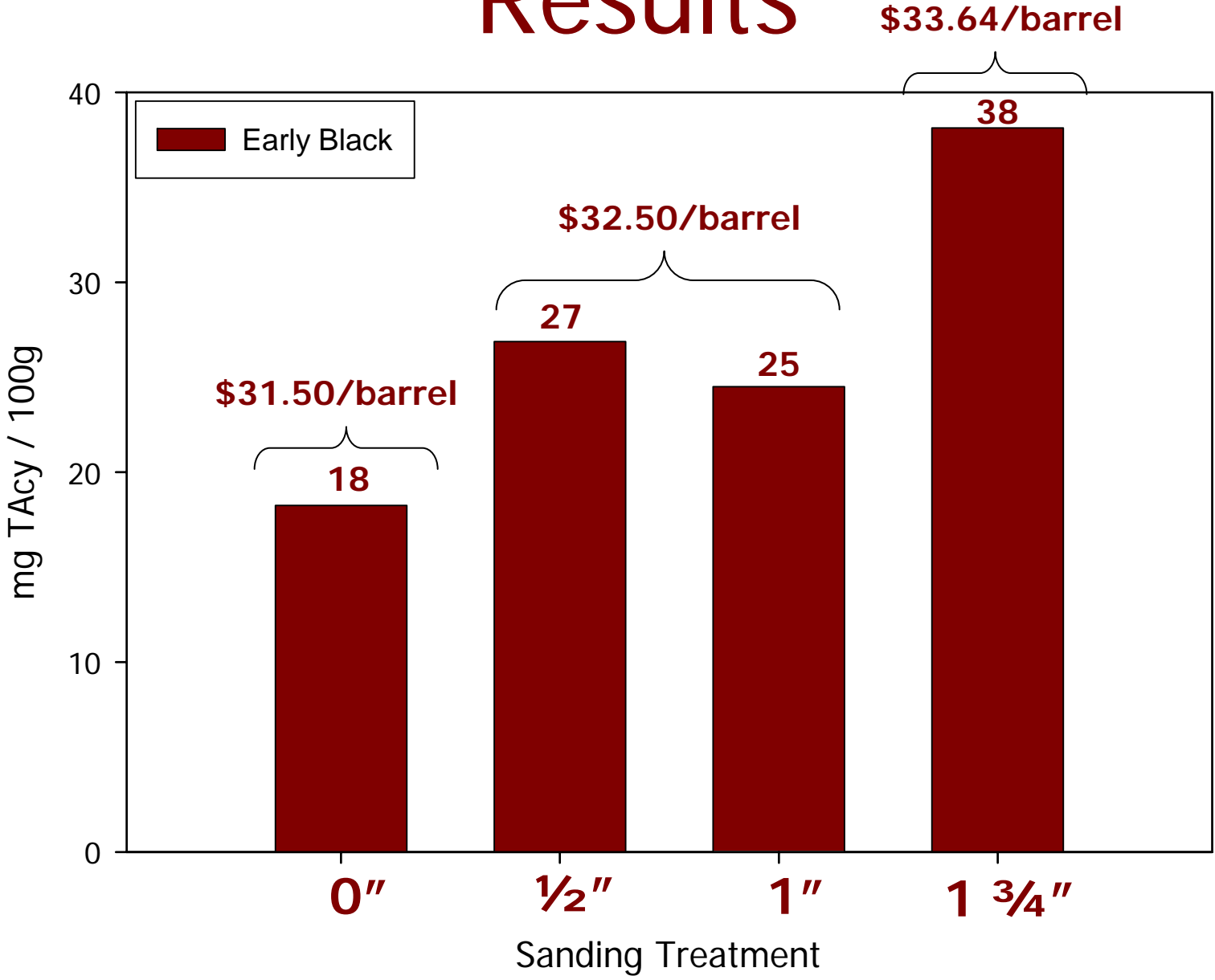
Results – Yield, Early Black



Results – Yield, Stevens



Results



Results

● Processed Fruit Price (\$/acre): EB

- 0" sanding treatment: \$4725
- 1/2" sanding treatment: \$3315
- 1" sanding treatment: \$1950
- 1 3/4" sanding treatment: \$740

Conclusions

- Sanding affects cultivars differently
 - EB is much more severely affected compared to Stevens
- Estimated plant density and yield
 - Stevens: Vegetative growth with respect to PD recovers in 4 months but yield was negatively affected by all sanding treatments
 - EB: Vegetative growth only recovers in 1/2" treatment in 4 months; yield is negatively affected by all treatments

Conclusions

- Anthocyanin test -TAcy values
 - In EB, sanding increases anthocyanins
 - Low yield negates color incentive
- Flooding interaction - CHO analysis TBD

Sand Application December 04

Does sand suppress
cranberry fruitworm?

Early Blacks



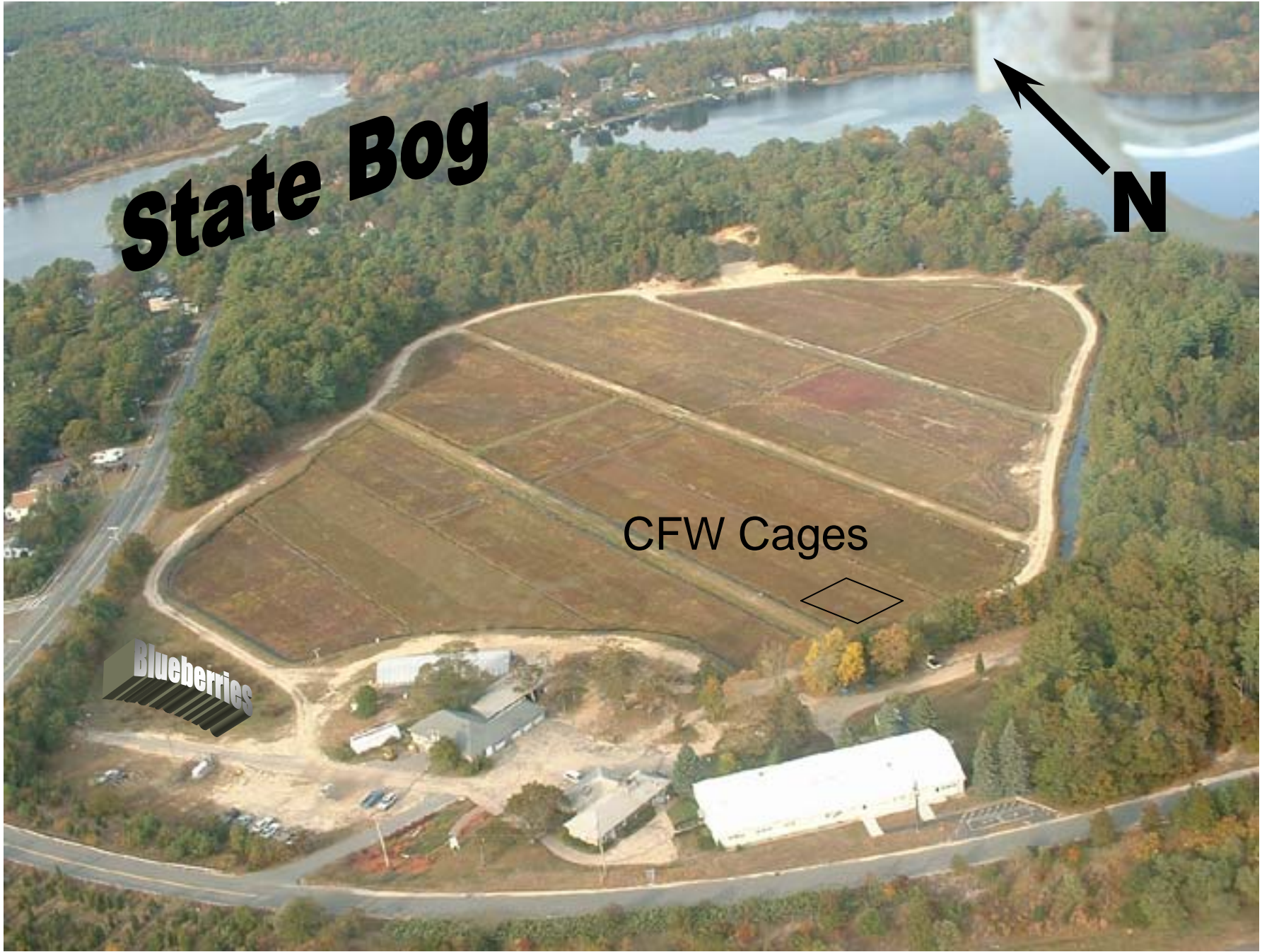
State Bog



CFW Cages



Blueberries





Cranberry Fruitworm

Acrobasis vaccinii (Pyralidae)

of CFW Moths

<u>TREATMENT</u>		<u>EMERGED</u>
Control	(600)	80
1/2 inch	(600)	110
1 inch	(600)	80
1 1/2 inch	(600)	27



Cranberry Fruitworm

Acrobasis vaccinii (Pyralidae)

of CFW Moths

<u>TREATMENT</u>		<u>EMERGED</u>
Control	(600)	80 (54)
1/2 inch	(600)	110 (24)
1 inch	(600)	80 (12)
1 1/2 inch	(600)	27 (10)



Cranberry Fruitworm



- Huge mortality, in field or lab
- Greater mortality when hibernacula were sunk into bog soil
- Maybe pathogens in soil attack hibernacula
- Maybe damaged from handling



Cranberry Fruitworm



- Ran trial in the lab
 - Dropped 10 wandering larvae into buckets
- In pure sand, 92% larvae spin cocoons at $\frac{1}{2}$ " but a few larvae go farther down
- In bog soil, 100% larvae spin cocoons at $\frac{1}{2}$ " or less
- BUT in bog soil, about $\frac{1}{2}$ the hibernacula went moldy



“Uniformity of sanding methods on cranberry bogs and its potential impact on swamp dodder control”

Authors: Laura Hunsberger, Carolyn DeMoranville,
Wesley Autio, and Hilary Sandler

● Dodder emergence can be reduced by applying sand

● 67% with 1 inch

● 4% with ½ inch

“Uniformity of sanding methods on cranberry bogs and its potential impact on swamp dodder control”

Authors: Laura Hunsberger, Carolyn DeMoranville,
Wesley Autio, and Hilary Sandler

- 1996-1997, 24 farms were measured
- 15 barge sanded, 9 ice sanded
- Measured target depth vs. actual depth applied

“Uniformity of sanding methods on cranberry bogs and its potential impact on swamp dodder control”

Authors: Laura Hunsberger, Carolyn DeMoranville,
Wesley Autio, and Hilary Sandler

- 9 ice sanded
- 6 applied $\frac{1}{2}$ of their target depth
- 3 were very close to target depth

- 15 barge sanded
- 12 applied $\frac{1}{2}$ or less of target depth
- 3 were very close to target depth

The background image shows a large green sanding machine with a hopper on top, moving across a vast, flat, sandy bog. The machine is leaving tracks in the sand. In the distance, there is a line of trees under a clear sky.

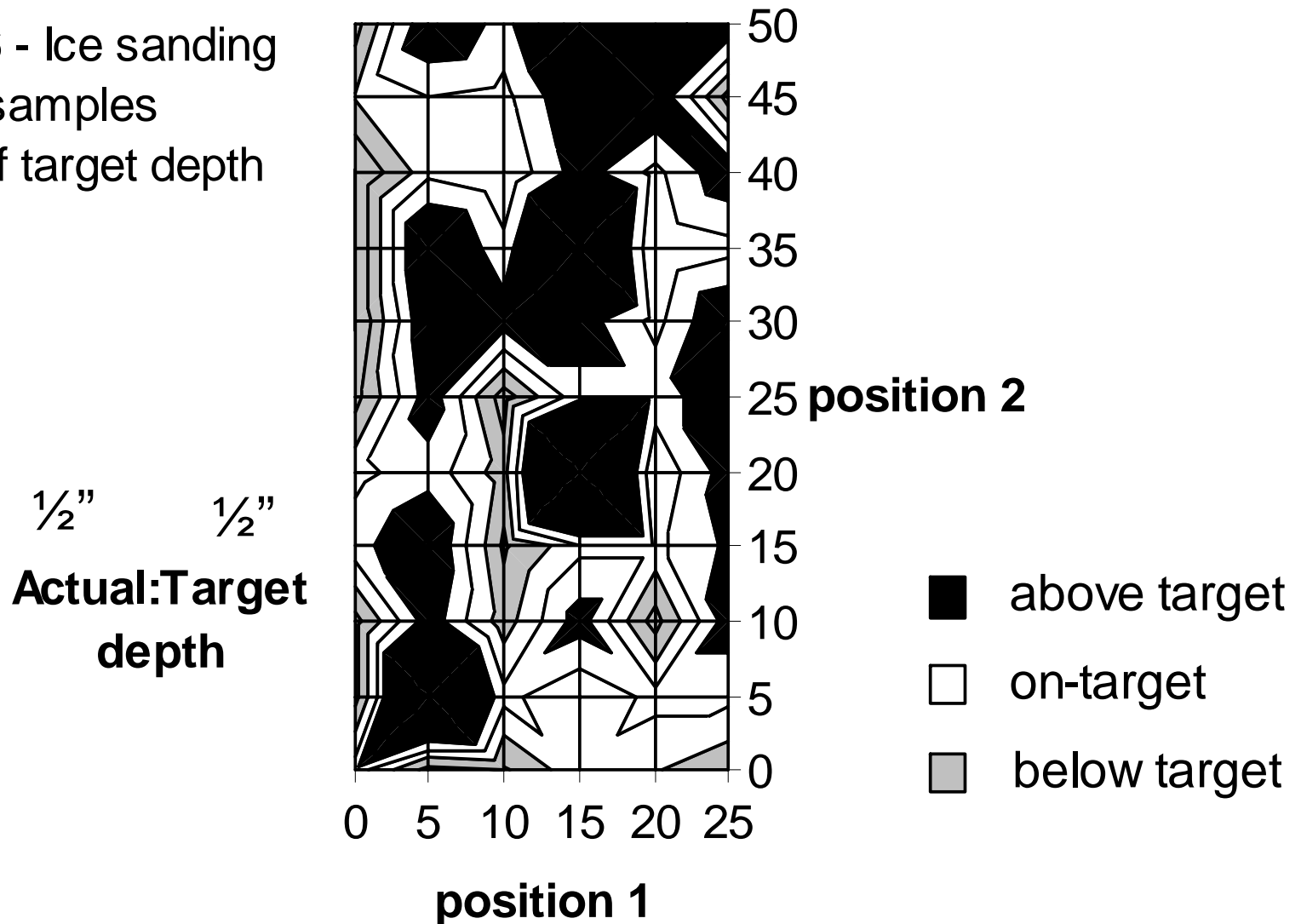
“Uniformity of sanding methods on cranberry bogs and its potential impact on swamp dodder control”

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- In all cases, 47-100% of the bog received less than the targeted depth
- Non-uniform layer of sand applied

Non-Uniformity – 1/2" Ice Sanded

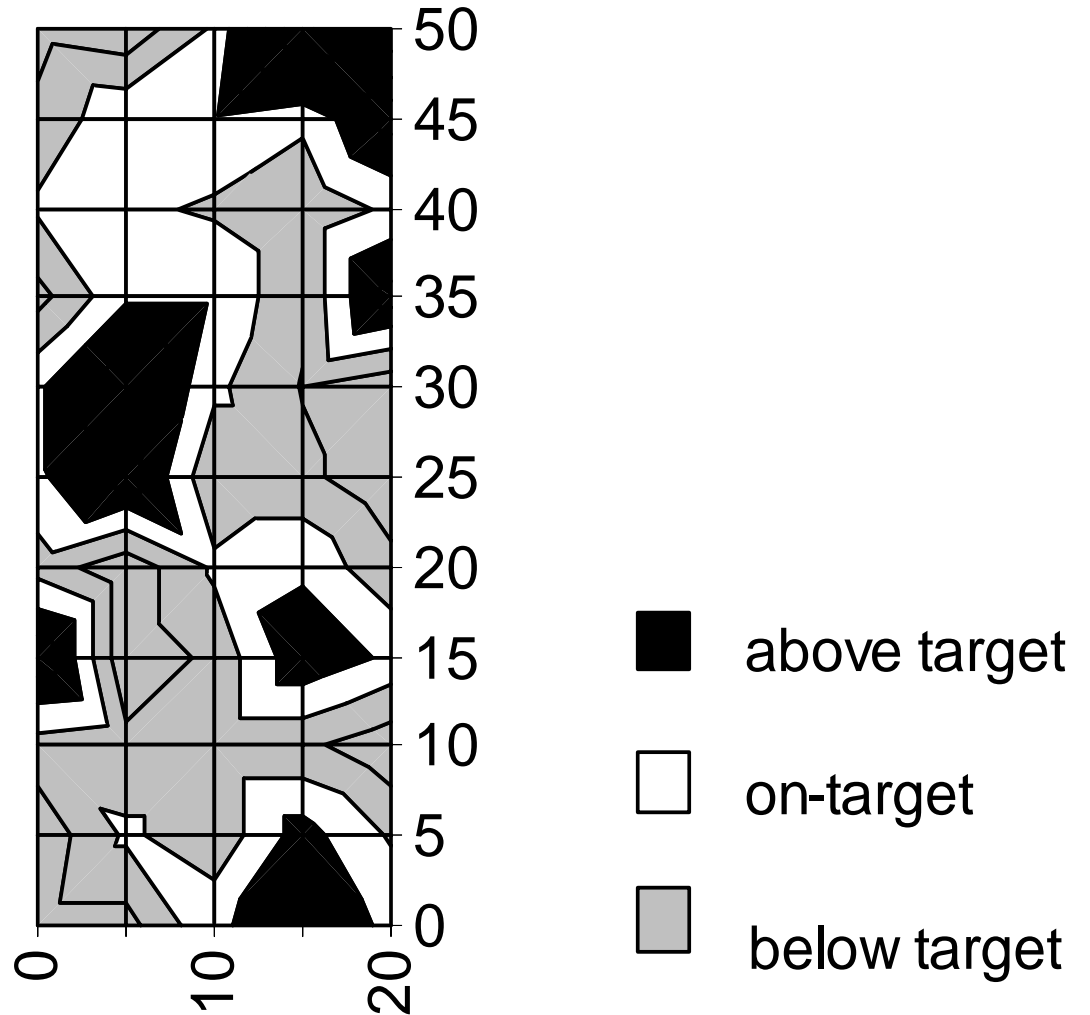
Farm 16 - Ice sanding
40% of samples
± 25% of target depth



Non-uniformity – 5/8" Ice Sanded

Farm 19 - Ice
33% samples
± 5% target

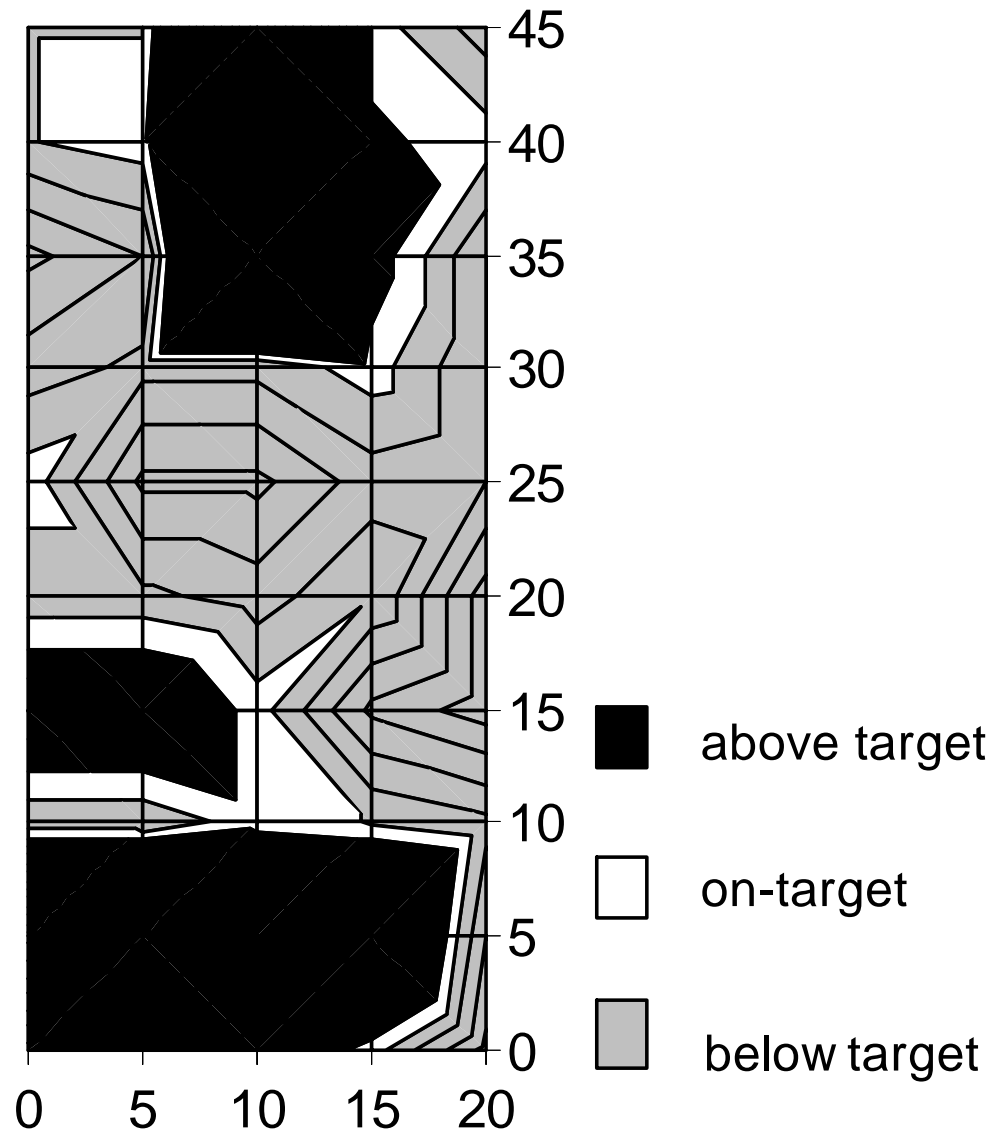
5/8" 5/8"
**Actual:Target
ratio**



Non-uniformity – 3/4" Barge Sanded

Farm 10 - Barge
18% samples
± 5% target

$\frac{3}{4}$ " $\frac{3}{4}$ "
**Actual:target
ratio**



Grand Sand Conclusions

