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Frost Cycling and Irrigation

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Frost Cycling and Irrigation



Peter Jeranyama, Faith Ndlovu,
Casey Kennedy & Carolyn
DeMoranville



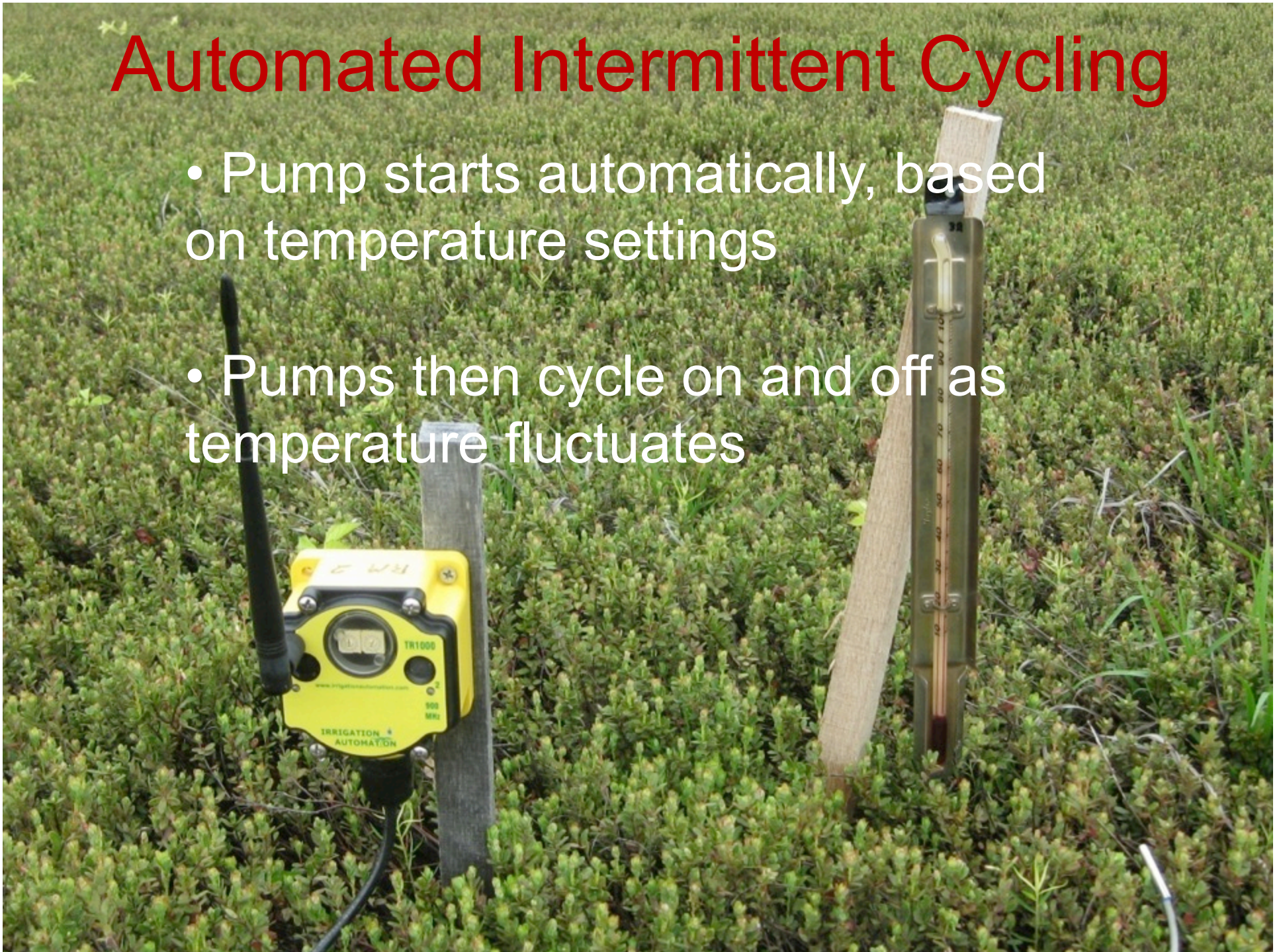
Objectives

- (1) To compare and contrast cycling and conventional methods.
- (2) Document water savings due to cycling.
- (3) Evaluate use of tensiometers & moisture sensors in irrigation



Automated Intermittent Cycling

- Pump starts automatically, based on temperature settings
- Pumps then cycle on and off as temperature fluctuates



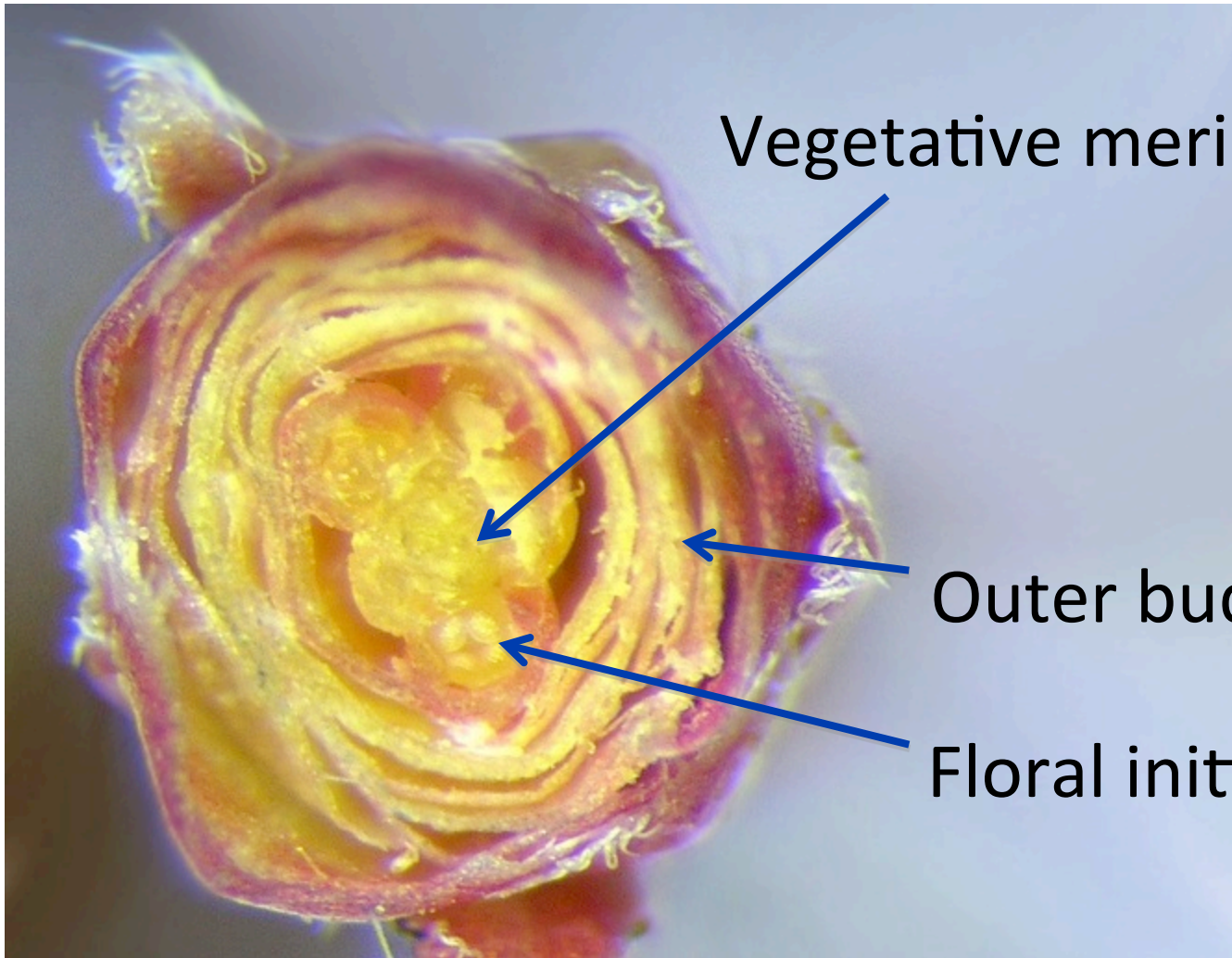
Bud Collection & Assessment

- 50 cranberry buds were collected at 3 frost events
- EB, Howes & Stevens under cycling & conventional



- Buds were dissected under a microscope and assessed for damage





Vegetative meristem

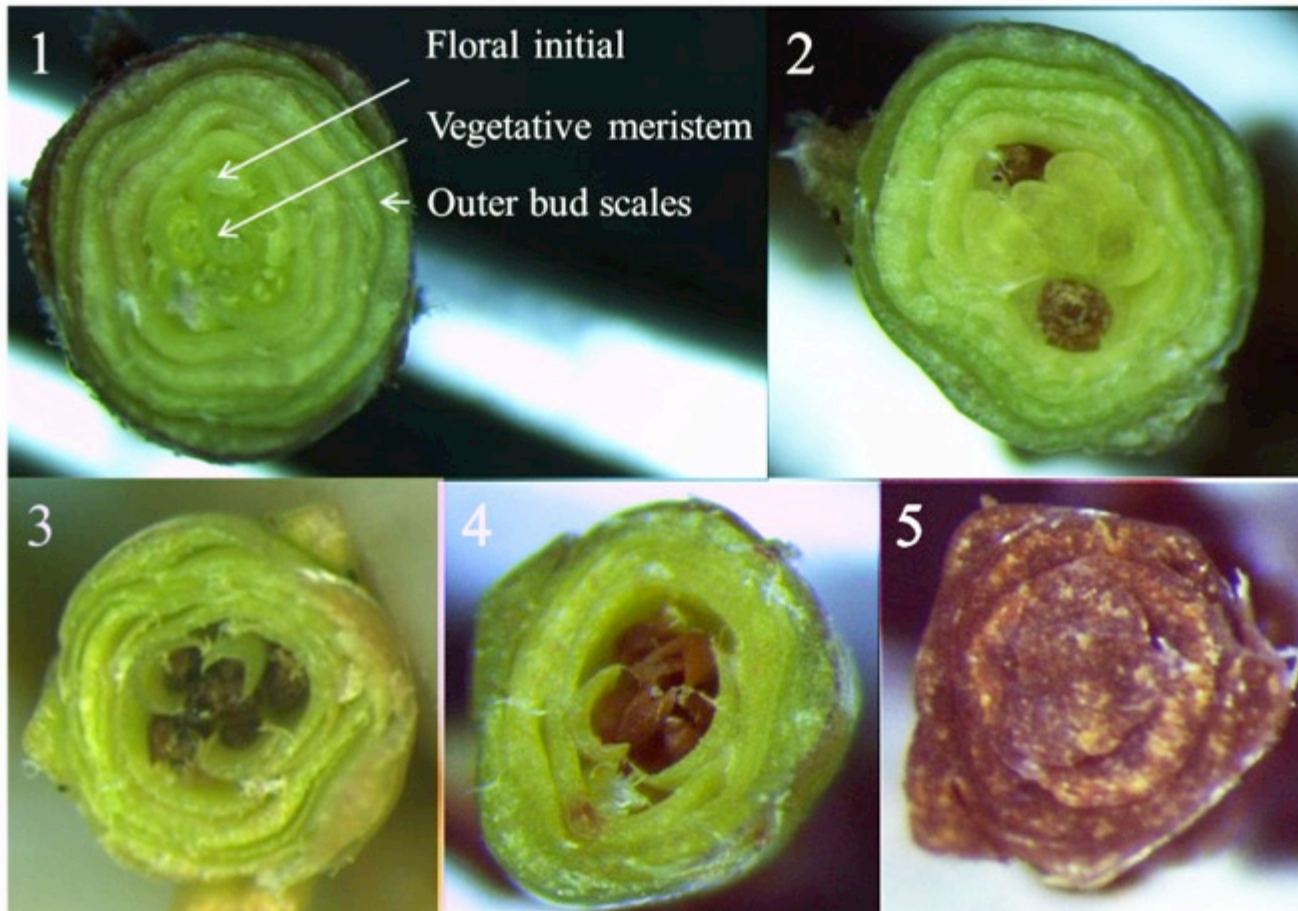
Outer bud scales

Floral initial

Source: DeMoranville



Cross sections of Cranberry Buds Rated by level of Damage



Source: Faith Ndlovu



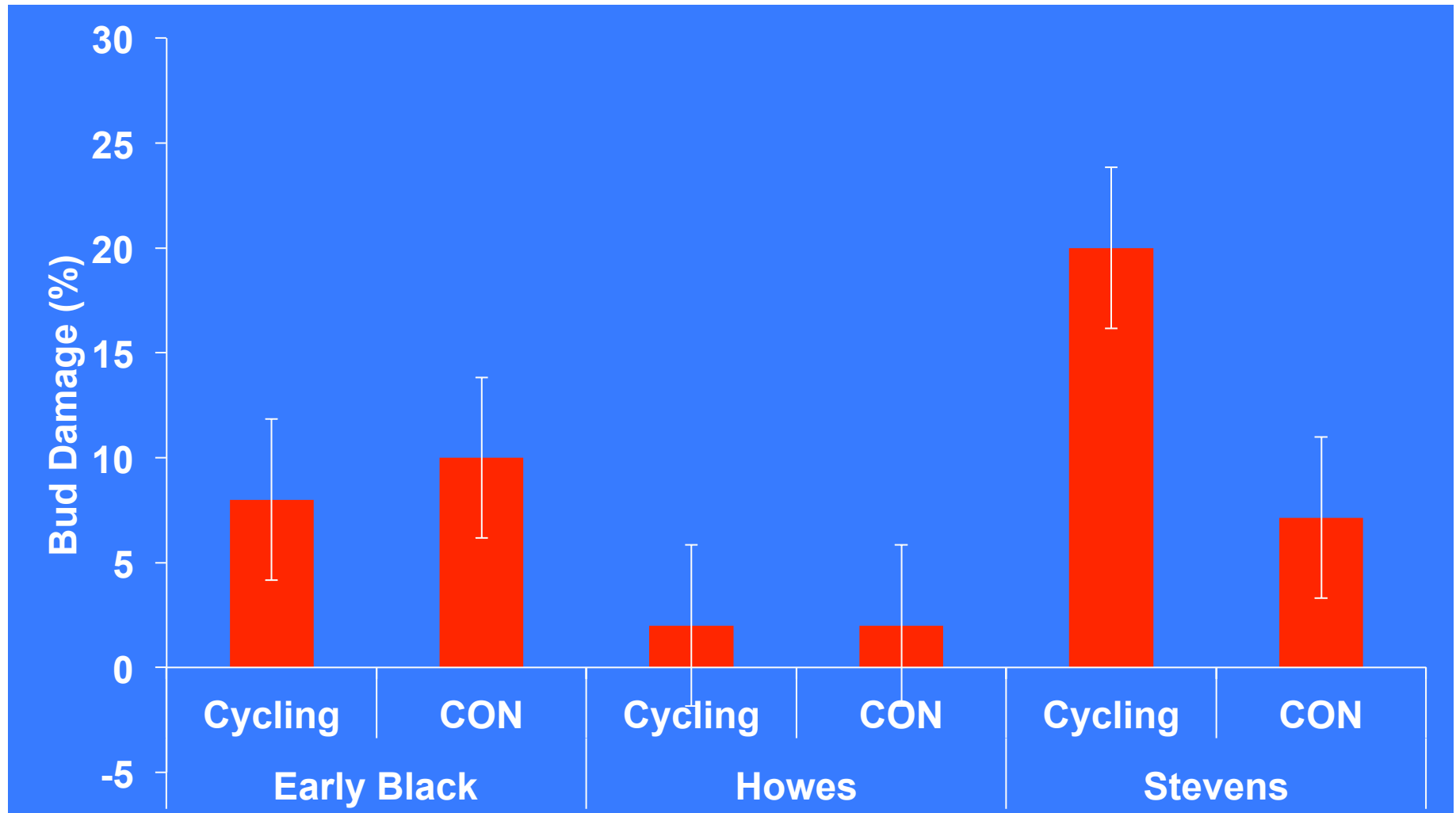


Measuring Water Use

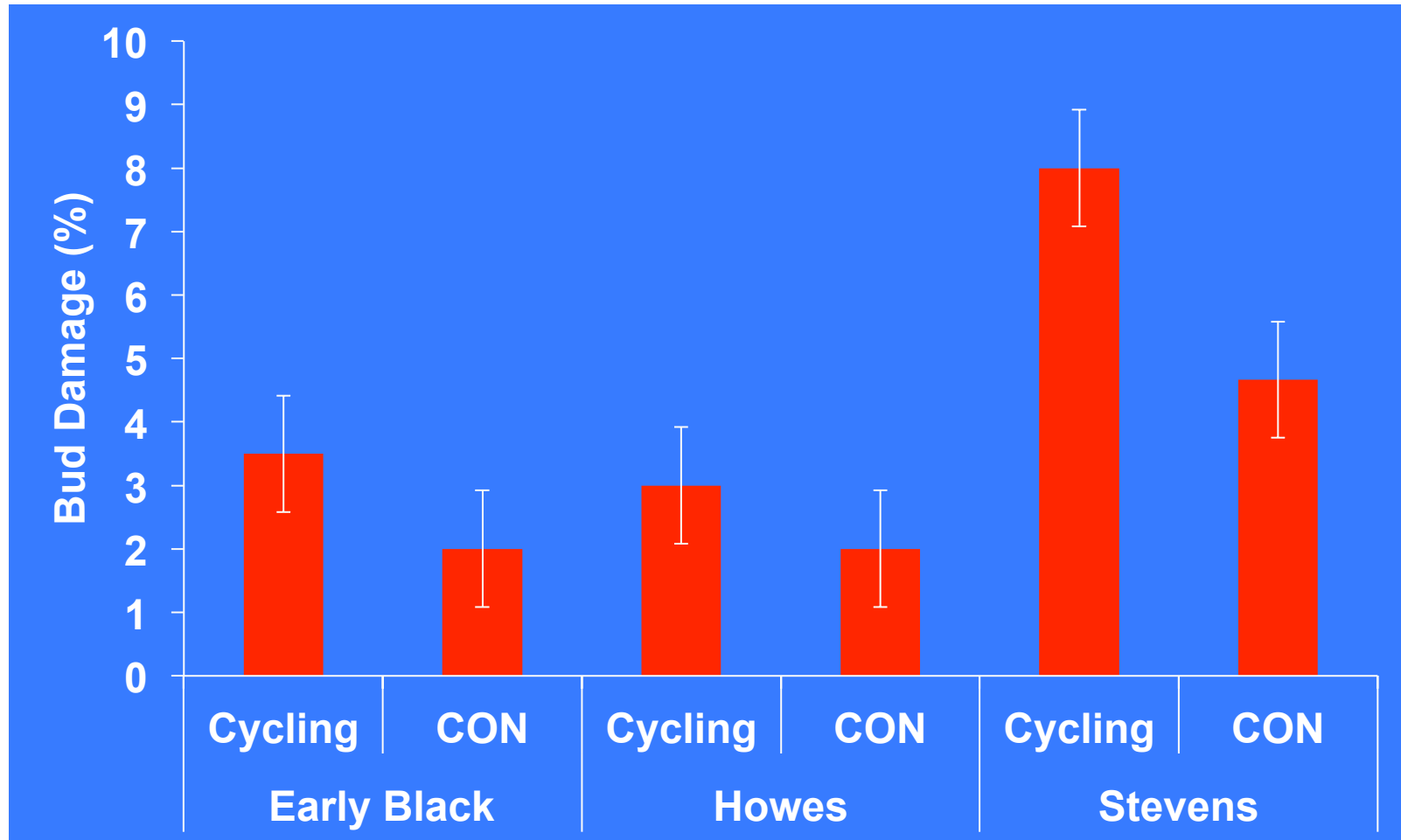
- Flow meters connected to a discharge pipe on an engine
- Volume of water recorded before and after each frost event



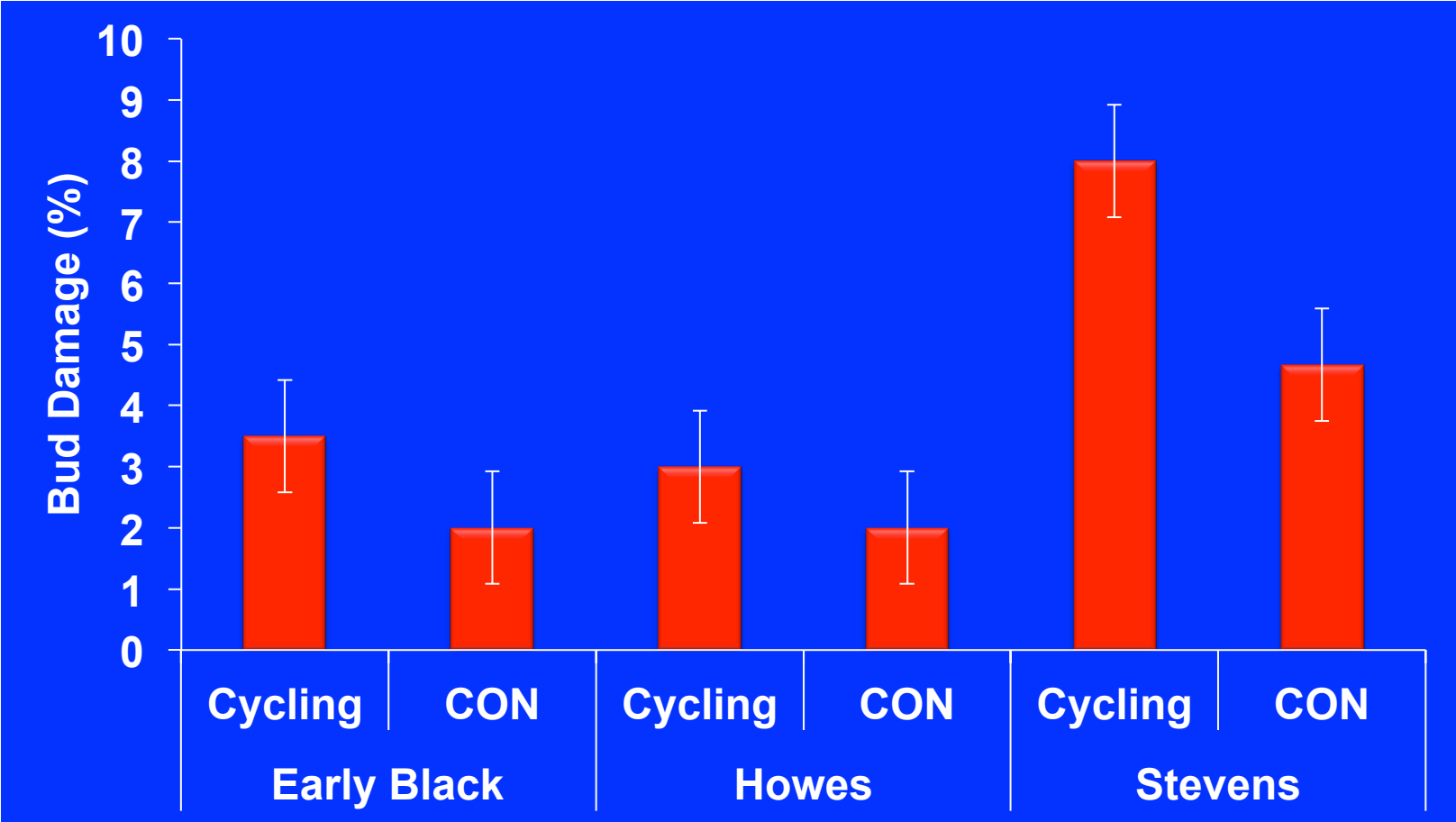
April 15, 2015



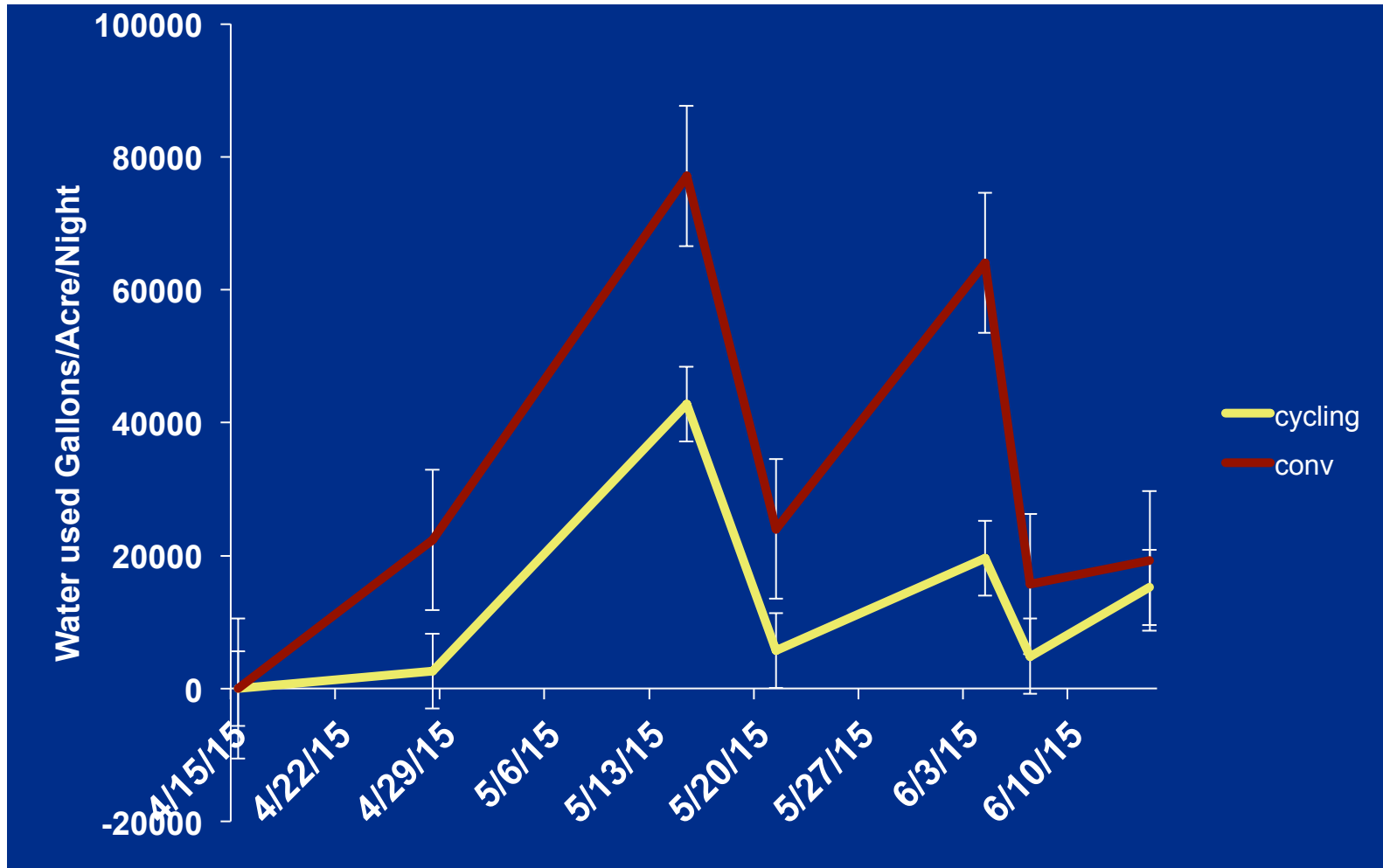
April 28, 2015



June 4, 2015



Water use by Frost Method, 2015

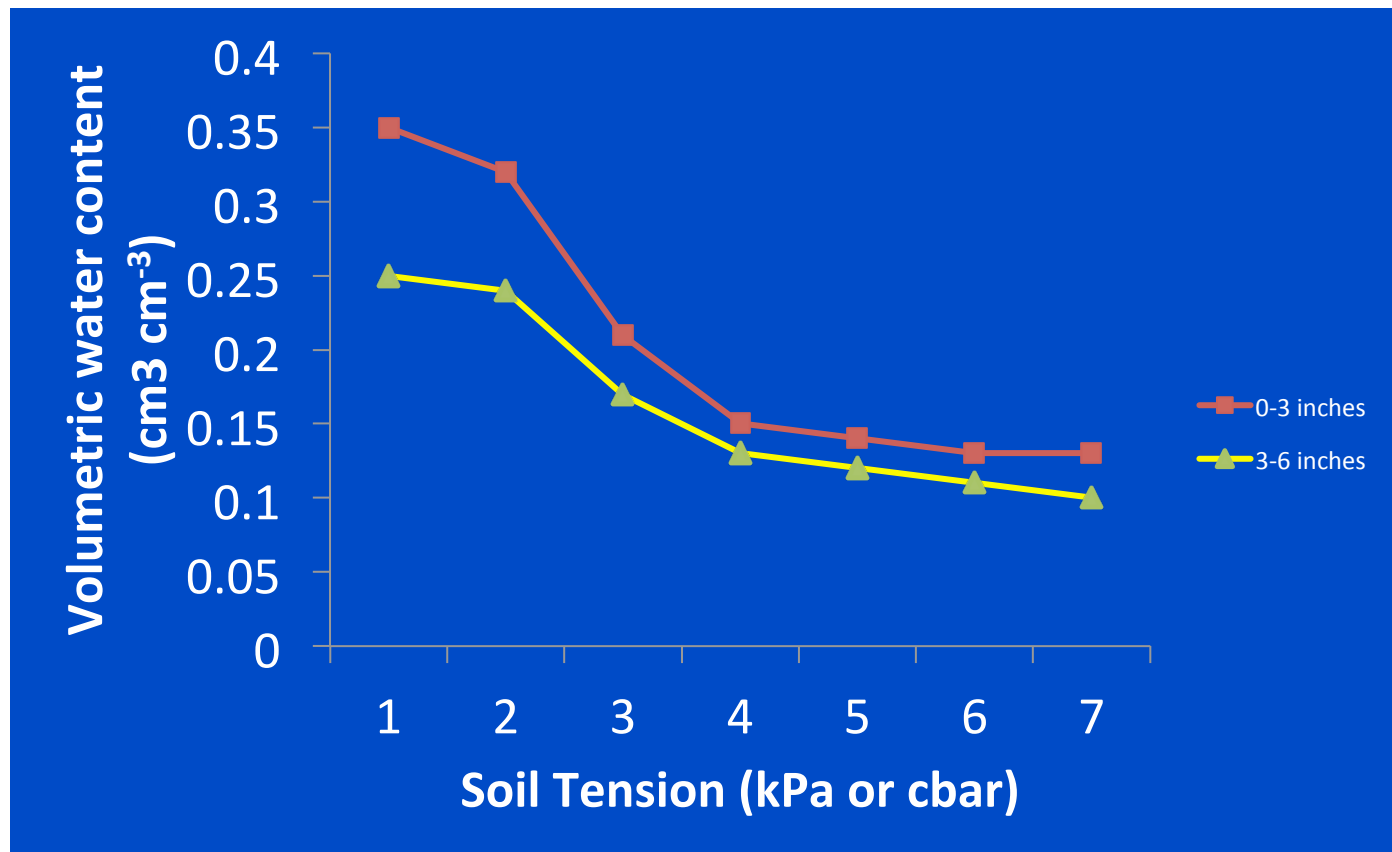




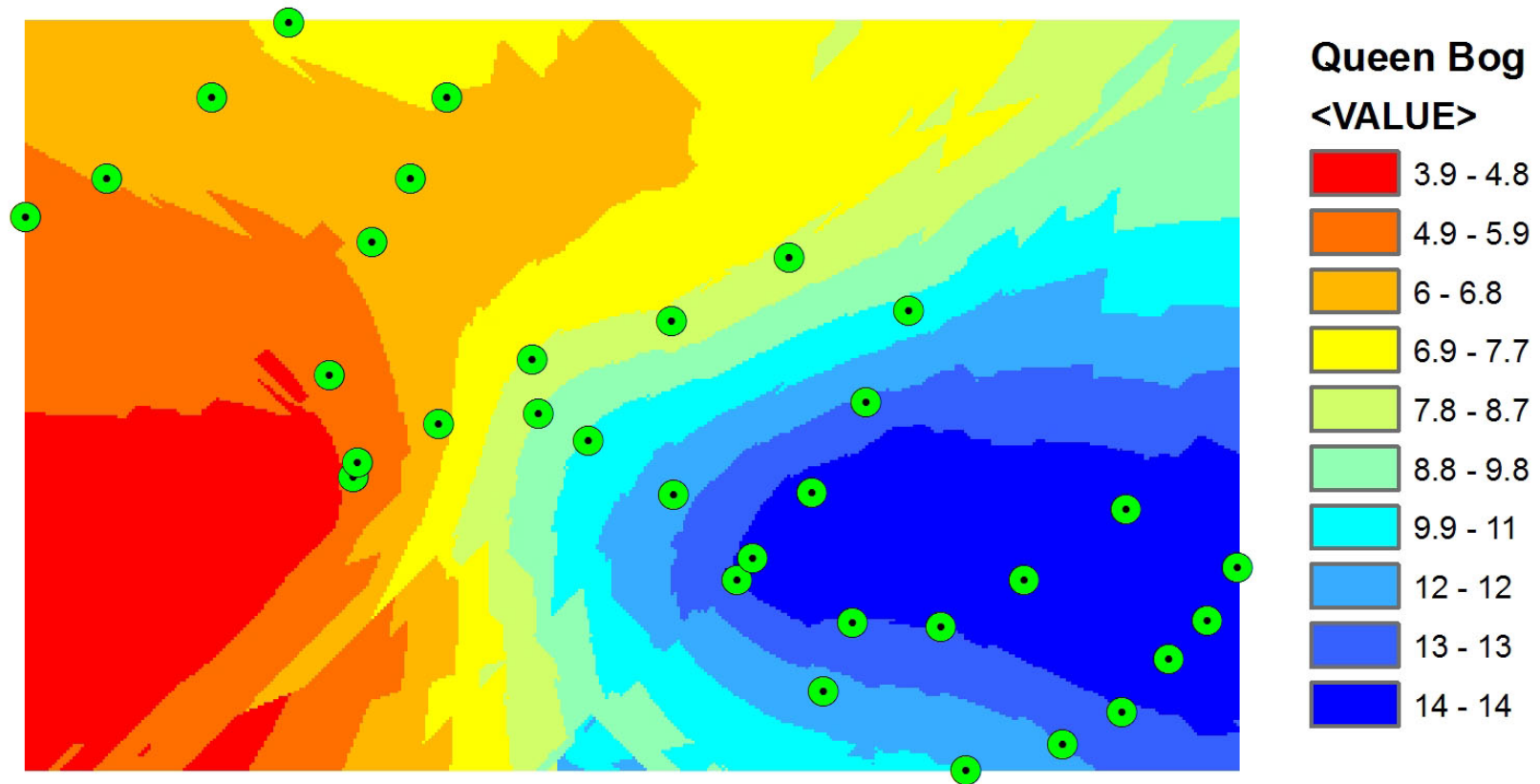
Cranberry yield results for 2013 and 2014

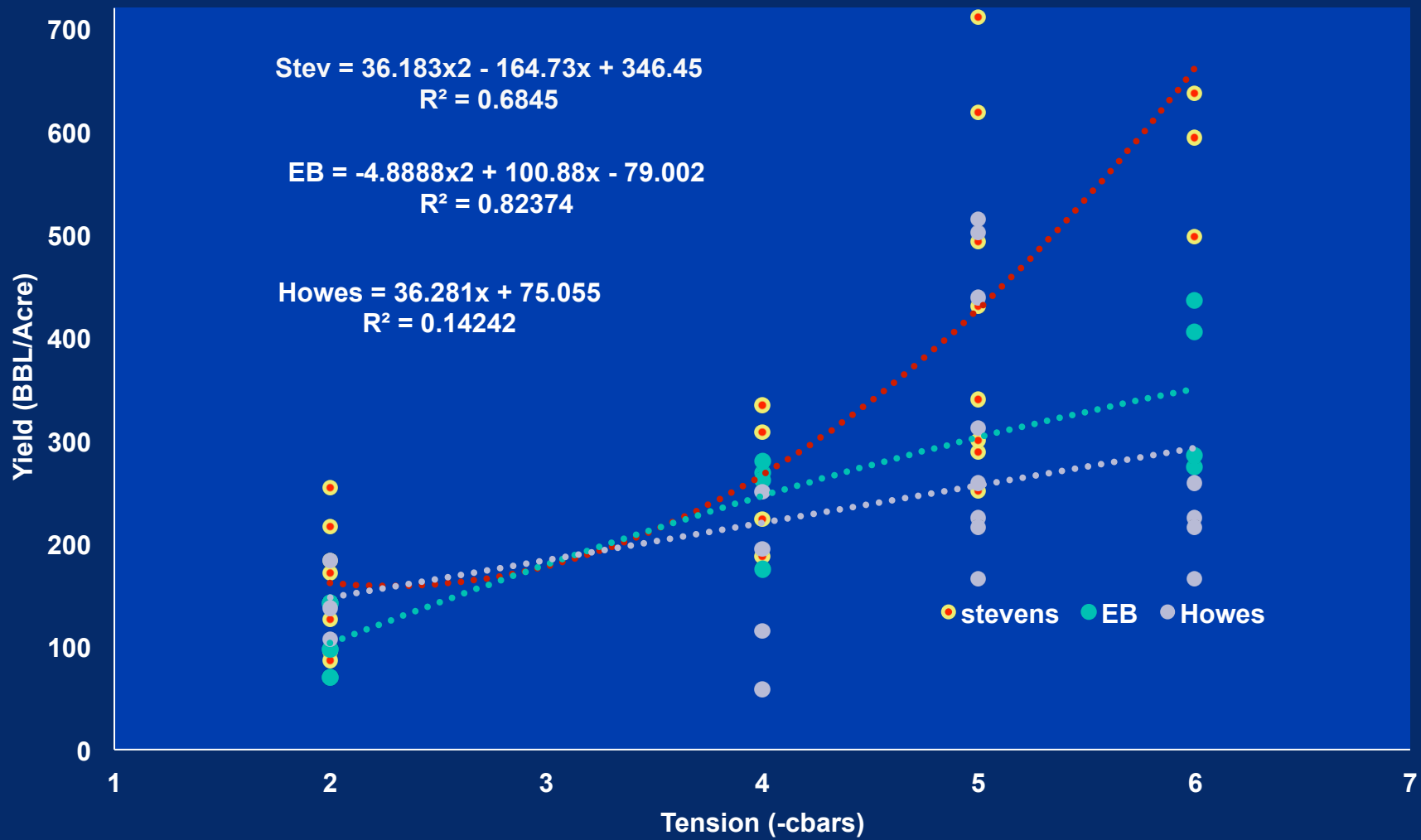
	2013		2014	
Cultivar	CYCL	CON	CYCL	CON
	-----BBL/Acre-----			
Early Black	198	207	200	210
Howes	239	235	280	260
Stevens	342	268	450	360
<i>LSD (5%)</i>	34	28	36	34

Water retention curve in the top 6 inches

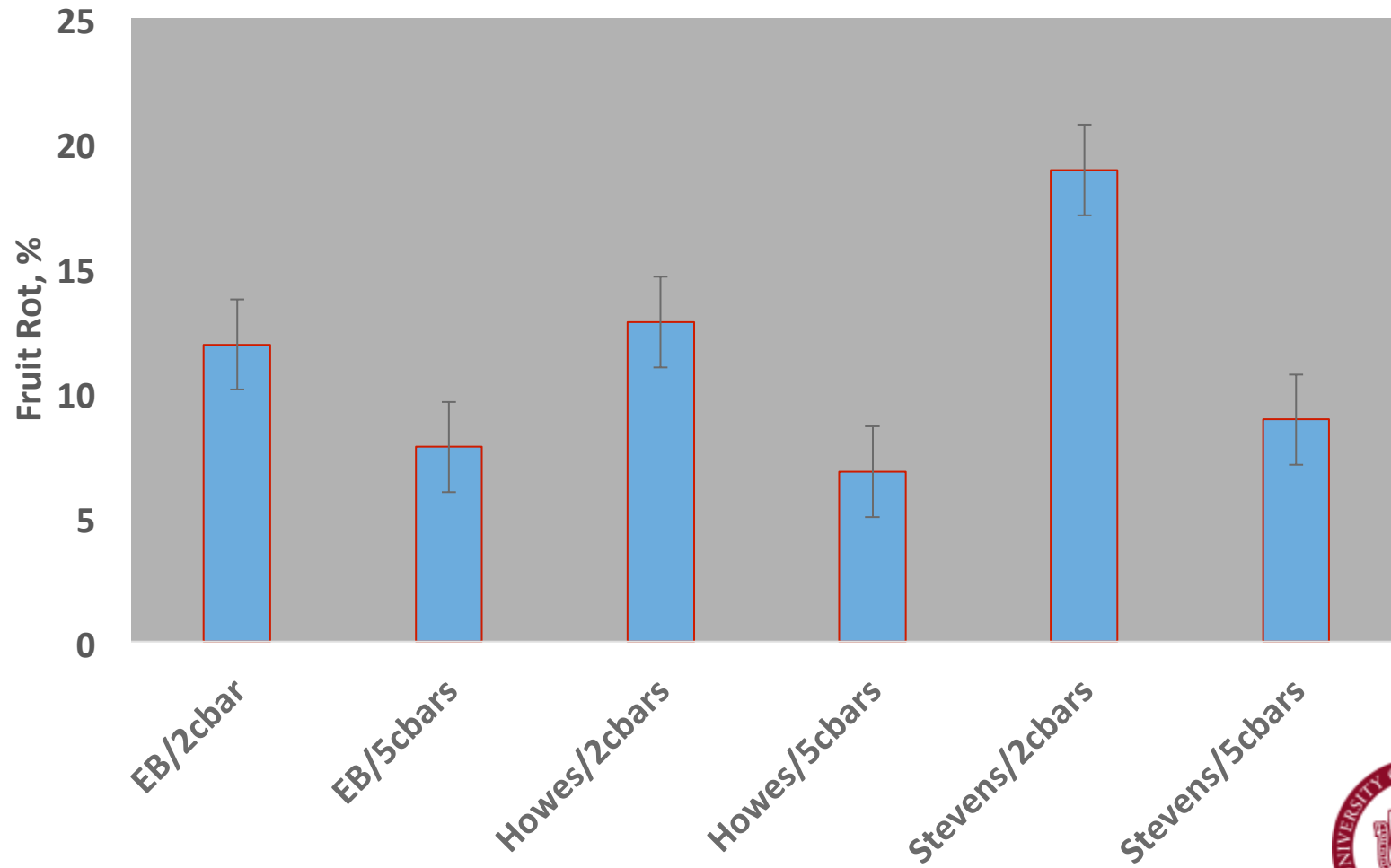


Volumetric Soil Moisture on a Bog





Fruit Rot as affected by Water Regime



Summary

1. Frost damage was $>14\%$ under cycling & less than 5% damage under CONV.
2. Most of the damage were on 1 or 2 floral initials.
3. Fruit yield was almost the same between the two frost protection methods.
4. Water savings of 7,600gallons/acre/day (30%) are possible with cycling.
5. Yield is increased as beds are kept drier (2 vs. 5 cbars).
6. Fruit rot more severe in wet beds.



Acknowledgments

