

Taku Someya

Kwantlen Polytechnic University

Cranberry Congress

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Cranberry Field Decline Project 2016, Interim Report



CFD Project 2015 Summary

- Soil characteristics
 - pH, Redox potential, humification
- Plant characteristics
 - Upright density, shoot/root ratio, canopy depth
- Tissue nutrient analysis
- Yield analysis

Key Findings in 2015

- First year for collecting data of CFD in BC cranberry bed
 - Defining optimal methods for data collection
- High variability in data
 - Soil, plant characteristics, yield
- Larger sample size needed
- Improve consistency in sampling method
- Canopy data suggesting possible carbohydrate depletion

Research Project Objectives, 2016-2017

Objective 1:

Understanding the characteristics of cranberry beds in BC, and their relationships with CFD symptoms

- a. Soil characteristics
 - Soil chemistry
- b. Plant characteristics
 - Canopy architecture
 - Carbohydrate status

Research Project Objectives, 2016-2017

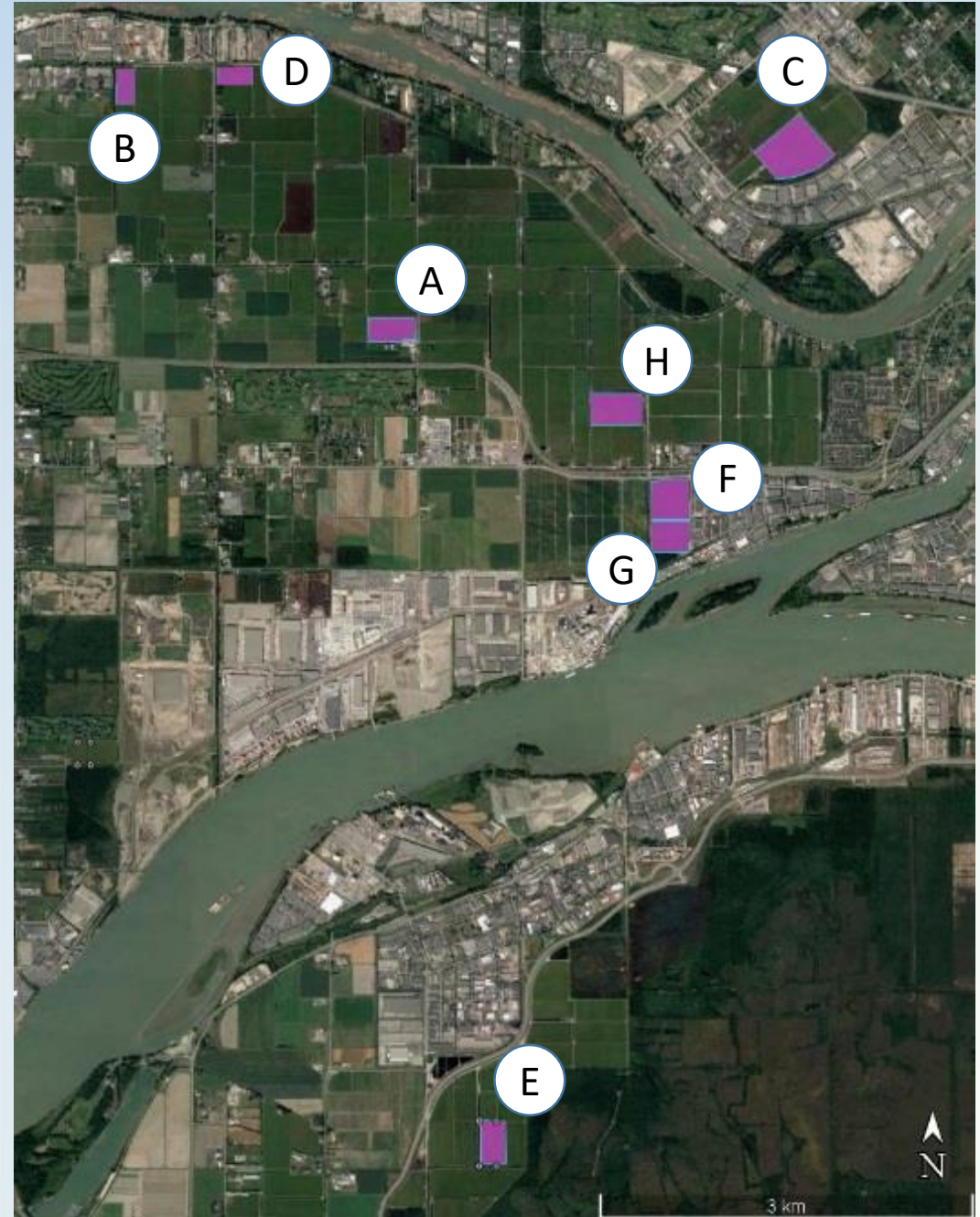
Objective 2:

Evaluating the effectiveness of soil remediation strategies and management practices

- a. Sanding treatment trial
 - Effectiveness on recovery from CFD
- b. Sand/sawdust incorporation trial
 - Effectiveness on prevention from developing CFD
- c. Evaluation of current management practices
 - Will be used for evaluating data analysis

Study Sites Locations and Assignment of Objectives

Objectives		Bed ID								* 1
		A	B	C	D	E	F	G	H	
1a	Soil Characteristics		✓	✓	✓	✓				
1b	Plant Characteristic		✓	✓	✓	✓				
	Carbohydrate Analysis	✓	✓	✓	✓					
2a	Sanding Trial						✓	✓	✓	
2b	Renovation Trial									* 1
2c	Management Survey	✓	✓	✓	✓	✓	✓	✓	✓	✓



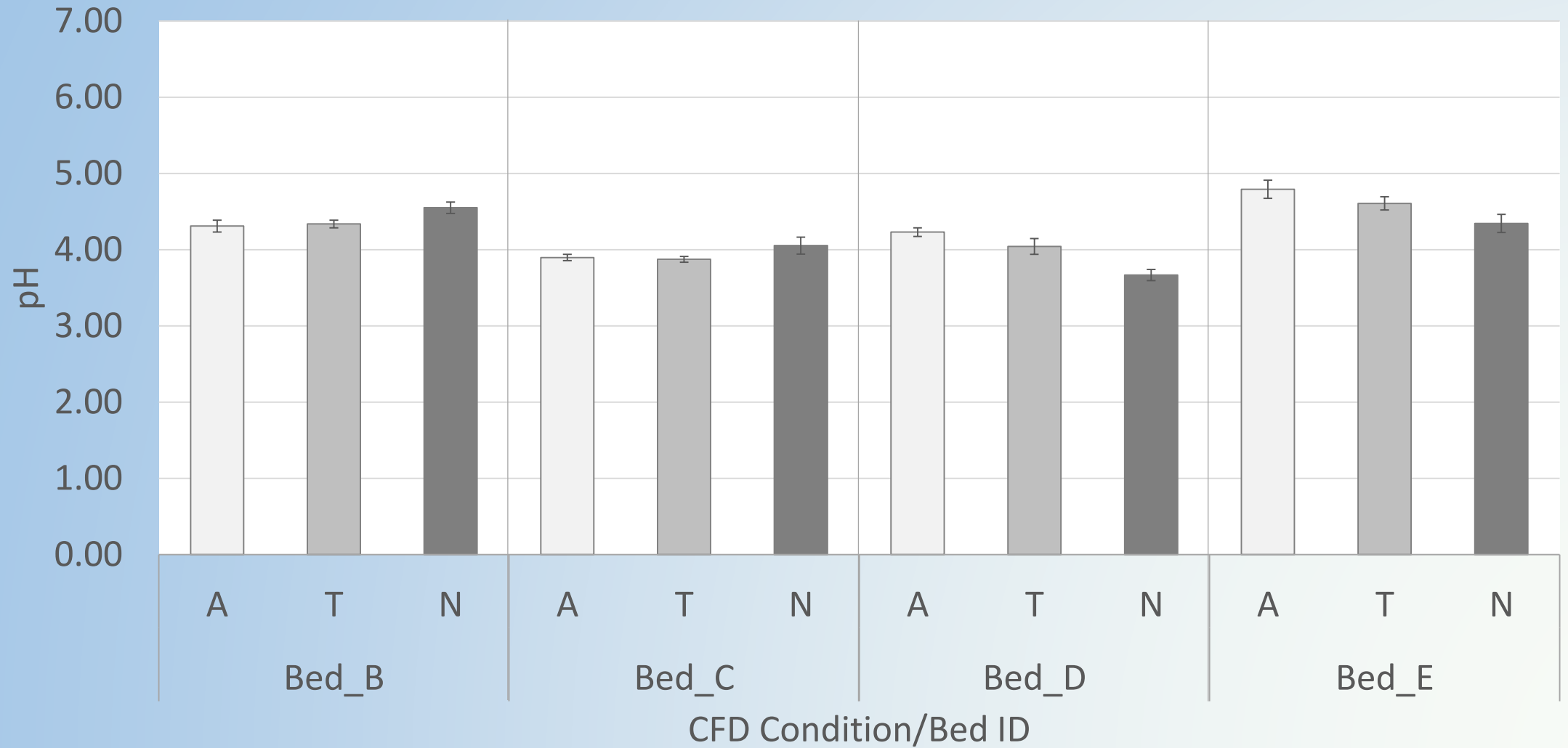
Summary for 2016

Objectives		Status
1a	Soil Characteristics	Completed
1b	Plant Characteristic	Completed
	Carbohydrate Analysis	Season 1 – sampling completed; analyses in progress Season 2 – 2017
2a	Sanding Trial (2 seasons)	Season 1 – completed Season 2 – 2017
2b	Renovation Trial	TBD
2c	Management Survey	Scheduled to be conducted in early 2017

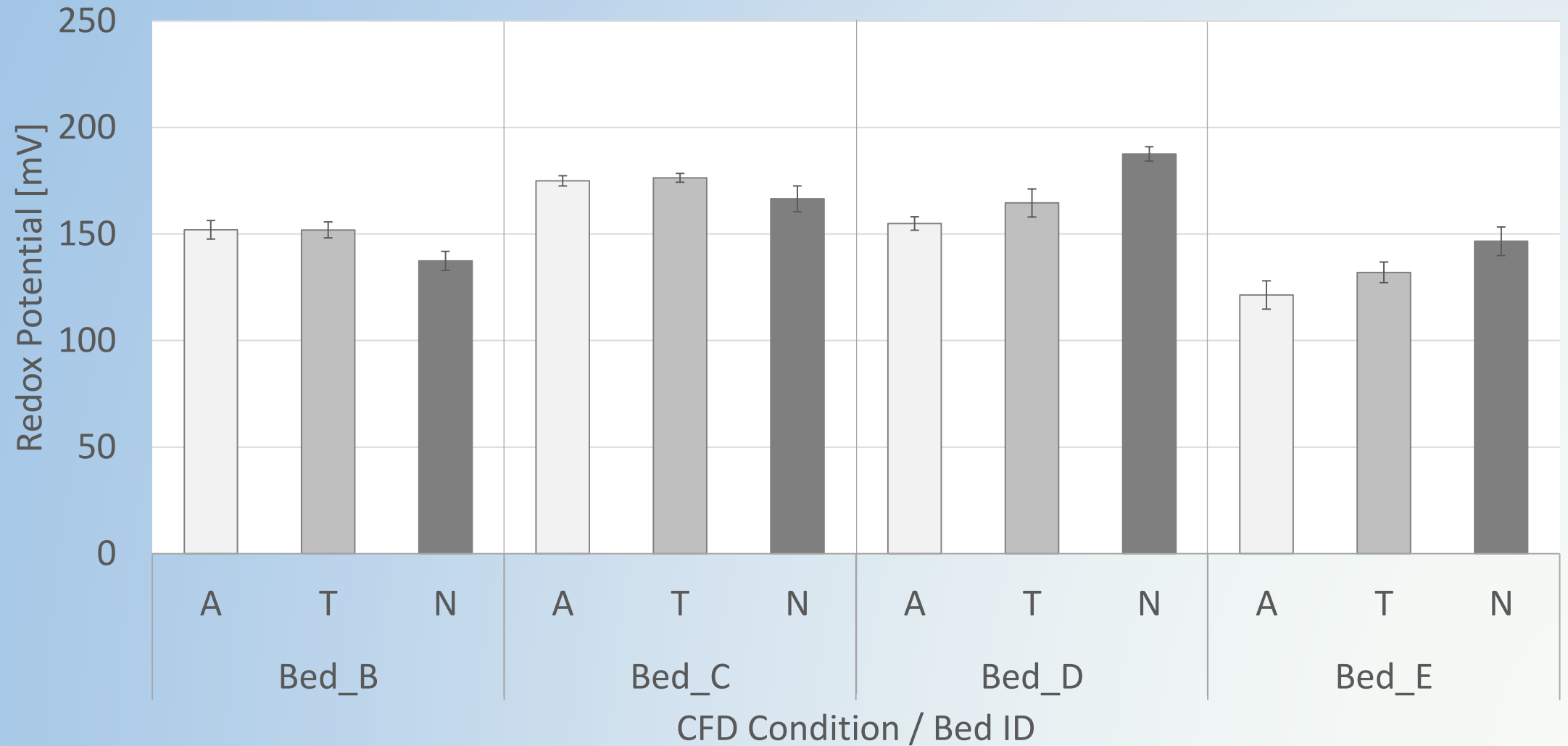
Obj1(a). Soil Characteristics Analyses

- Soil Chemistry measurement (repeat from 2015)
 - pH,
 - Redox potential, and
 - E.C.

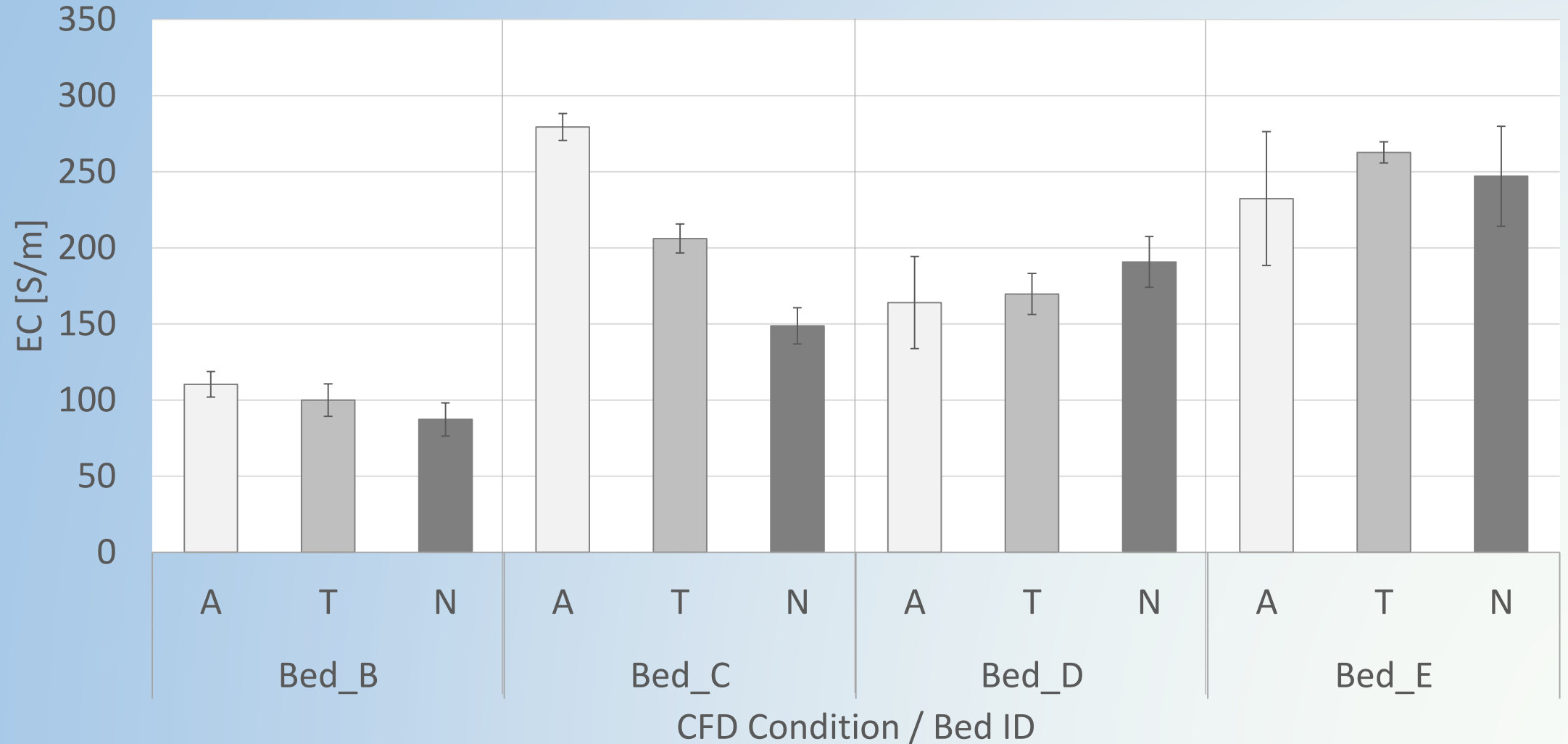
Soil pH



Soil Redox Potential



Soil EC (electric conductivity)



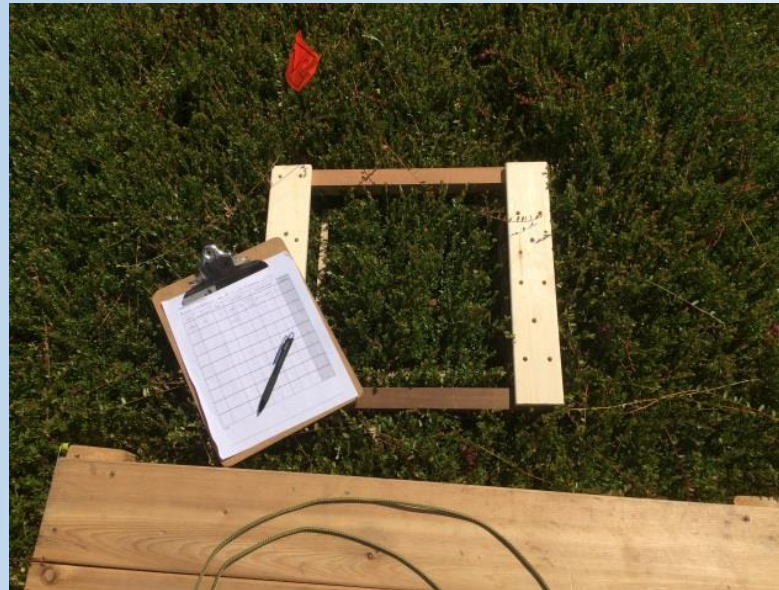
Obj1(a). Soil Characteristics Analyses

Summary

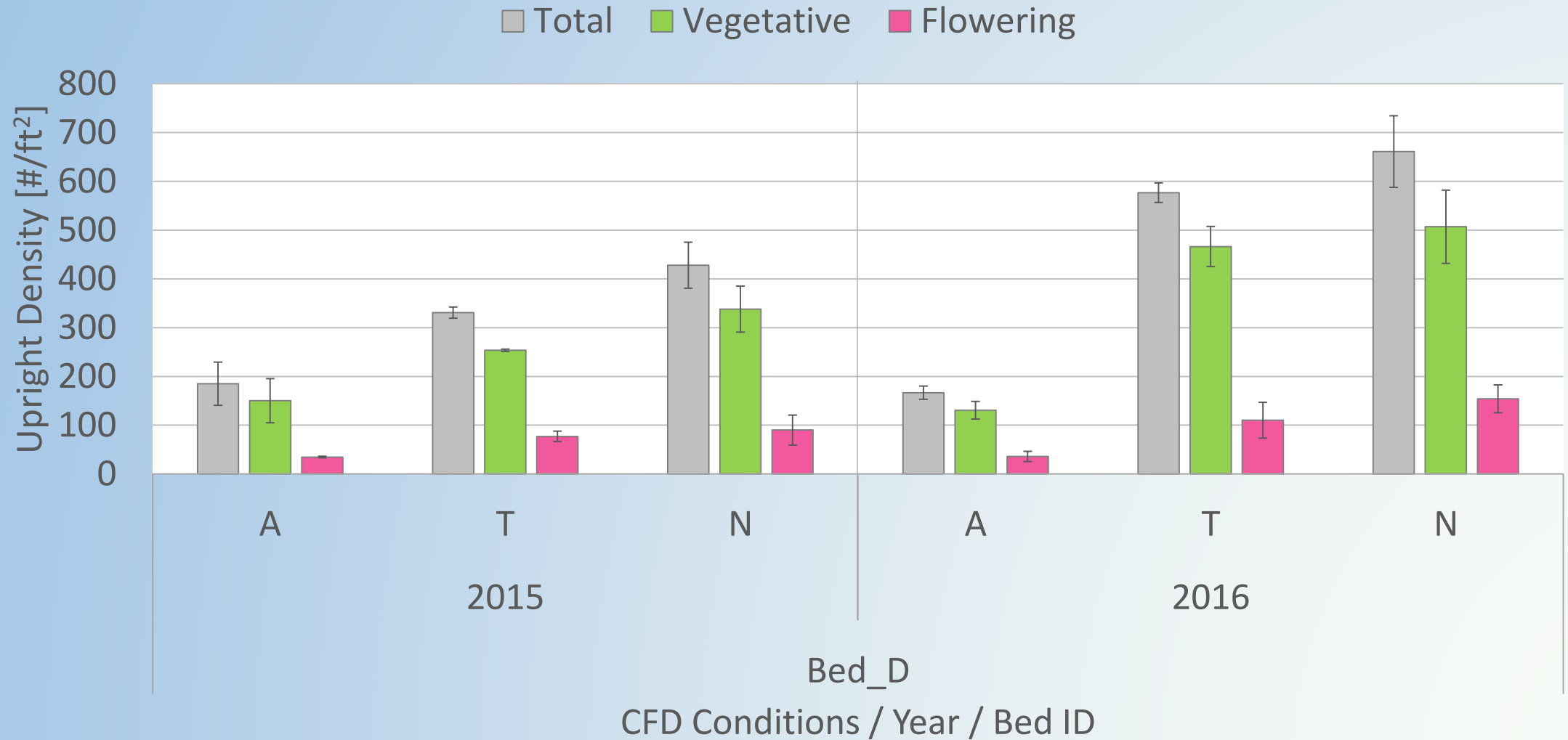
- No consistent trend between CFD conditions
- Might require larger sample size
- Current system has limitation to increase sample size
 - Not completely in-situ method, requires some lab work
- Continuously seek better measurement/testing system

Obj1(b). Plant Canopy Characteristics

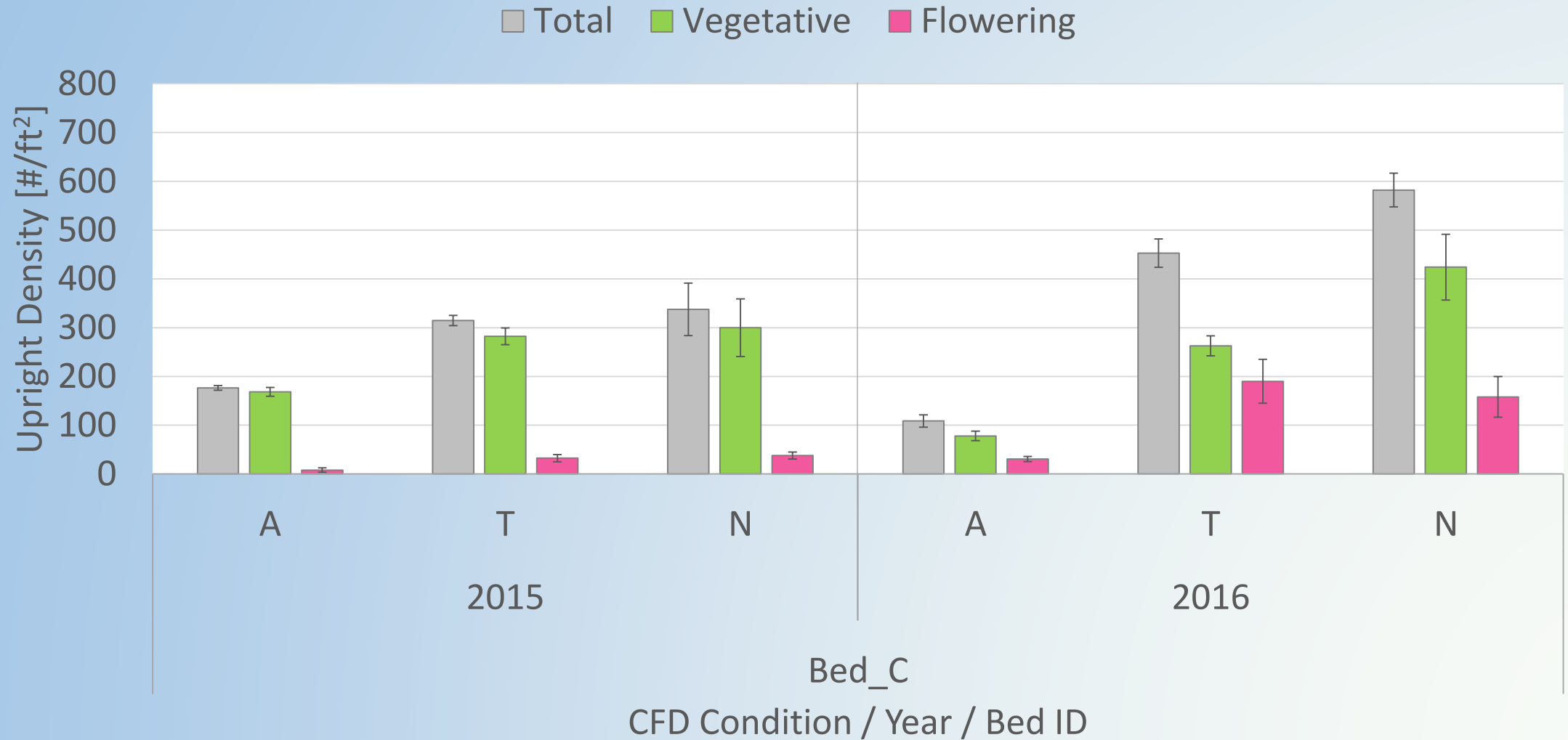
- Repeat from 2015
- Upright density
- Canopy depth
- Rooting capacity



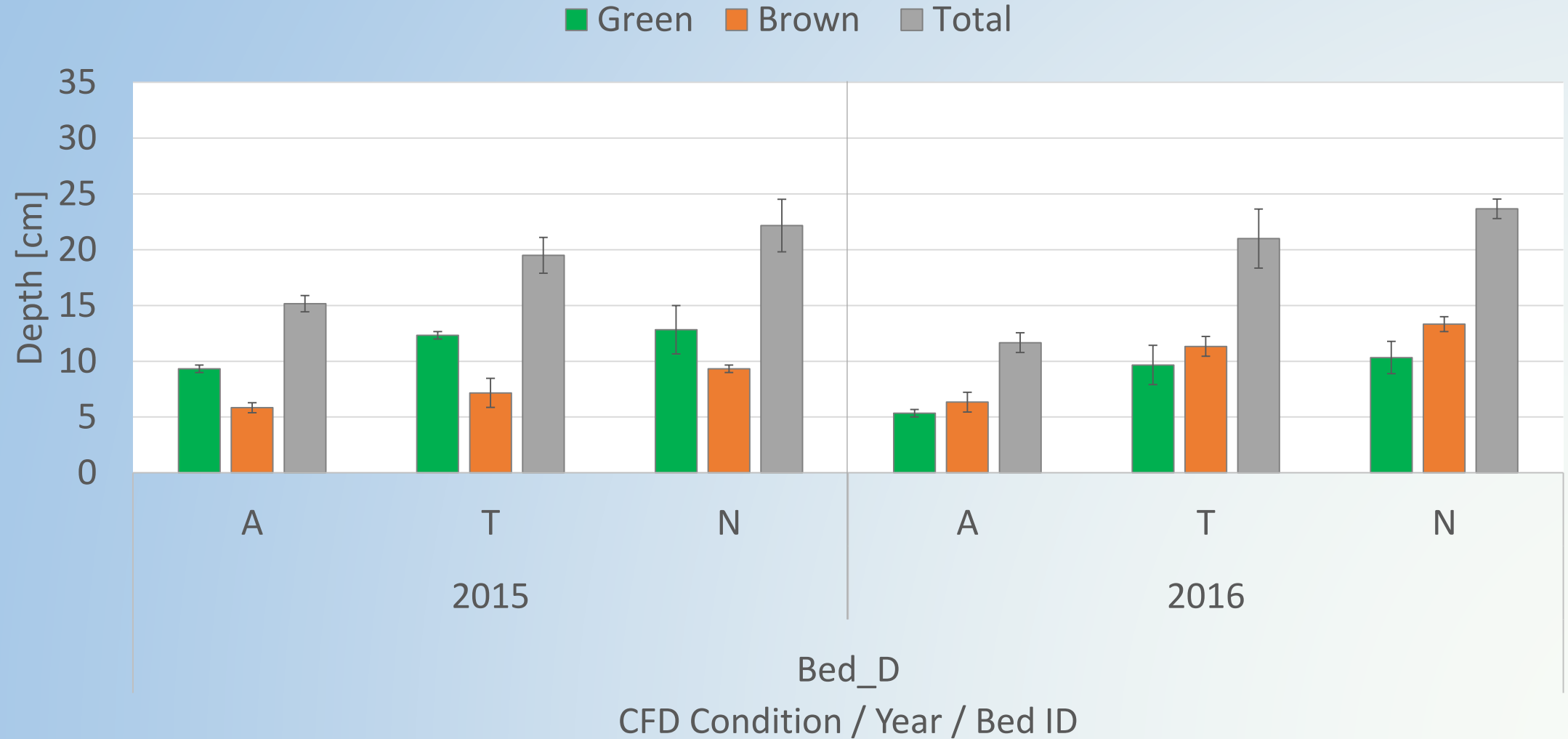
Upright Density – Bed D



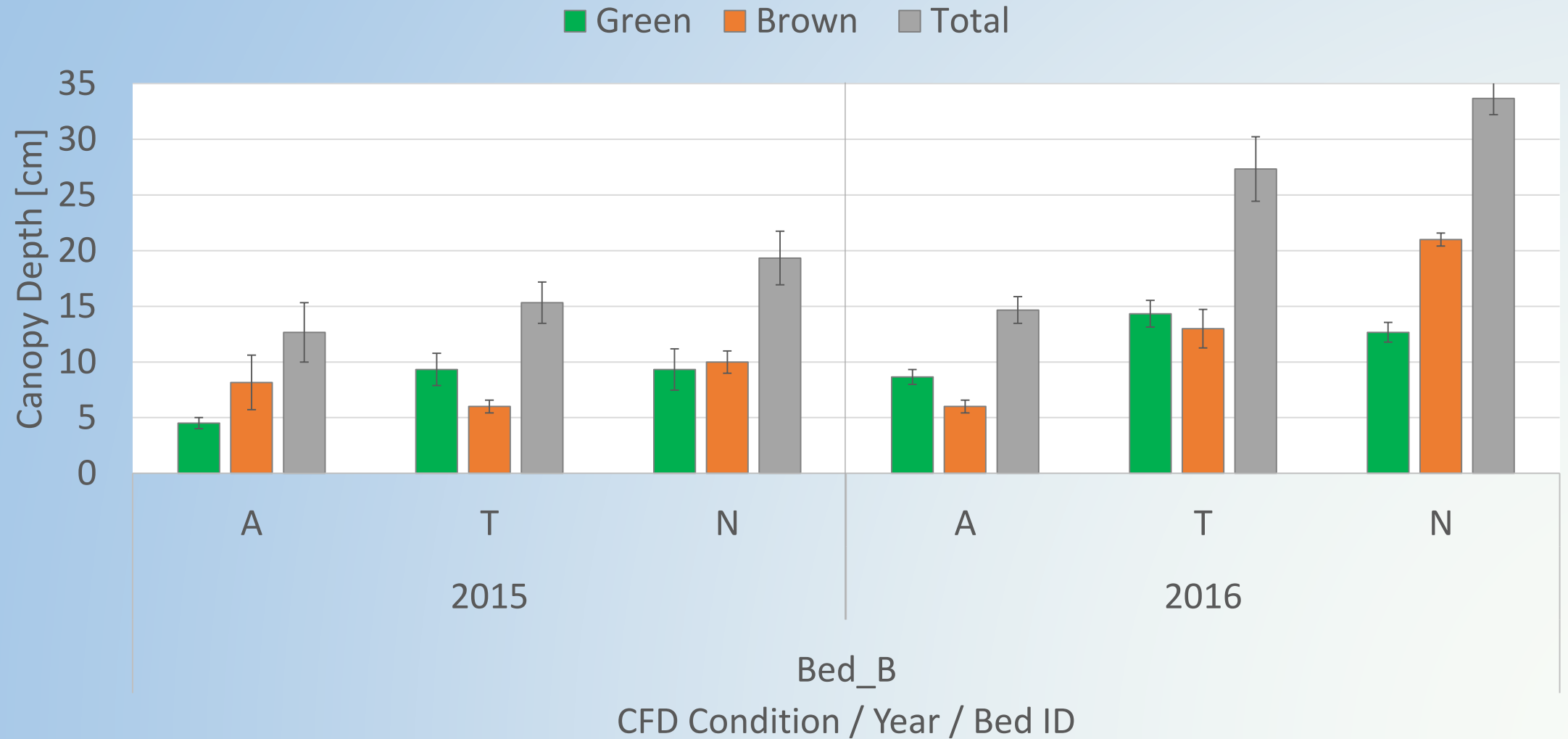
Upright Density – Bed C



Canopy Depth – Bed D



Canopy Depth – Bed B

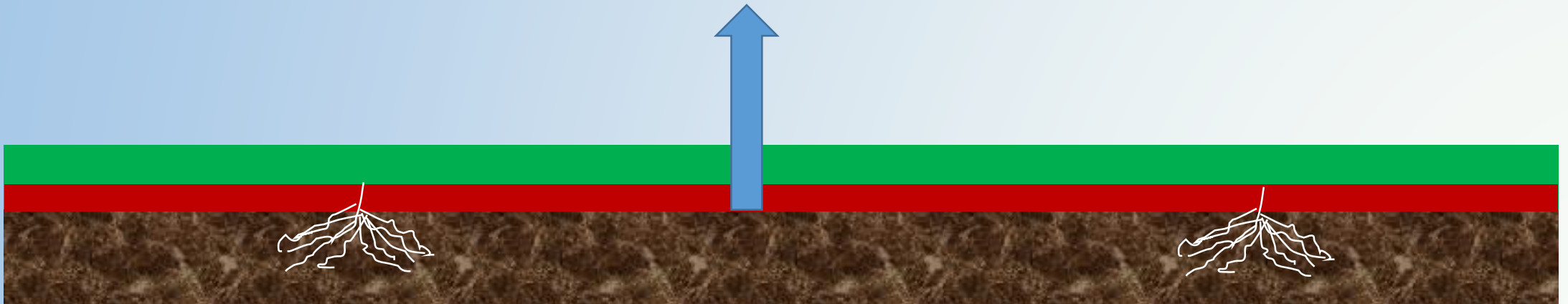


Defining Root health

- Poor root-health observed in all field decline areas in 2015
 - Remains unclear if poor rooting is a cause or symptom of CFD
- Direct measurement of root density conducted in 2015
 - Extremely time consuming
 - Difficult to retain fine root
- Needed to develop indirect measurement to indicate root capacity
 - No significant destruction
 - Easily performed (cost, equipment)
 - On-site test (no lab process)

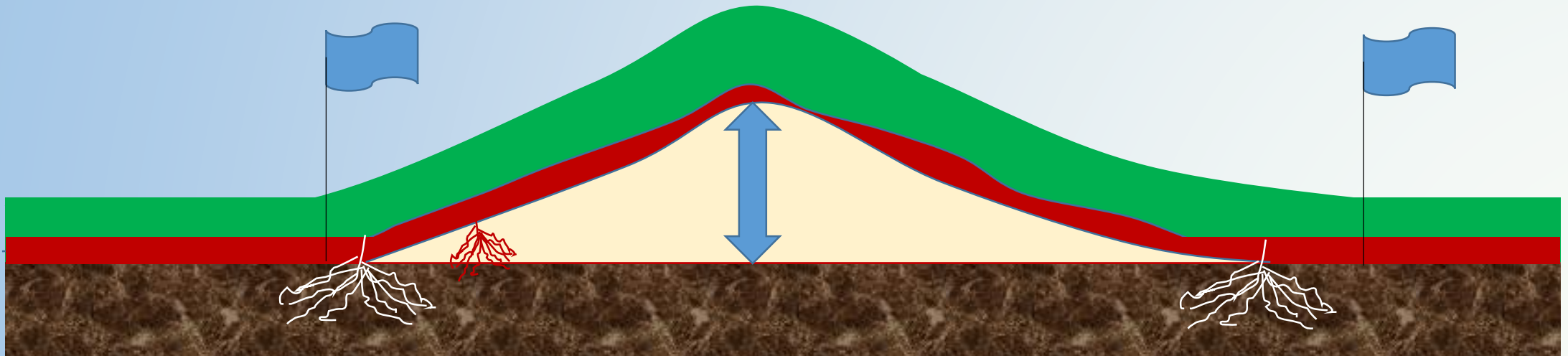
Pull Test

- Pulling up the canopy at a point from the bottom
- By hand (grabbing from the very bottom of the canopy)
- No need to cut & peel an area of “mat”/vines



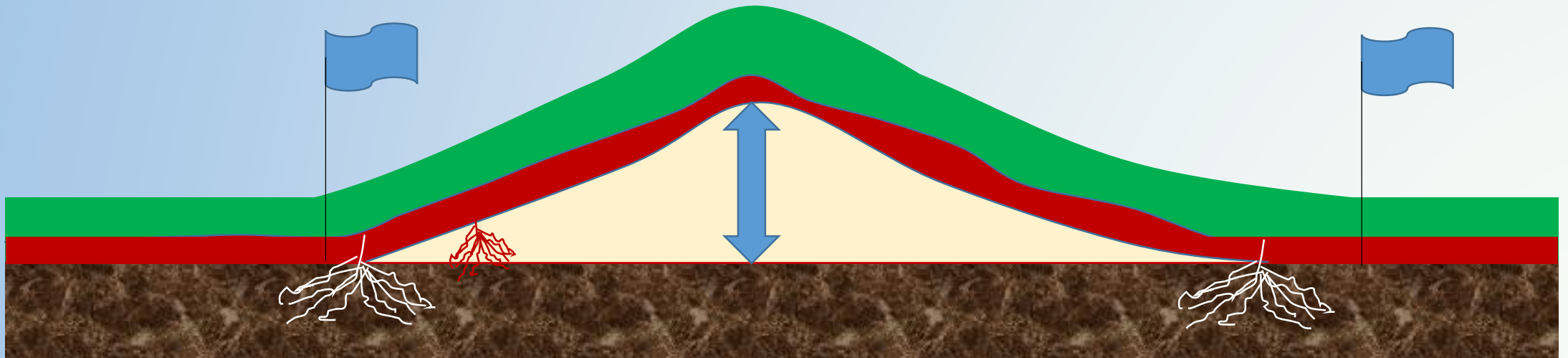
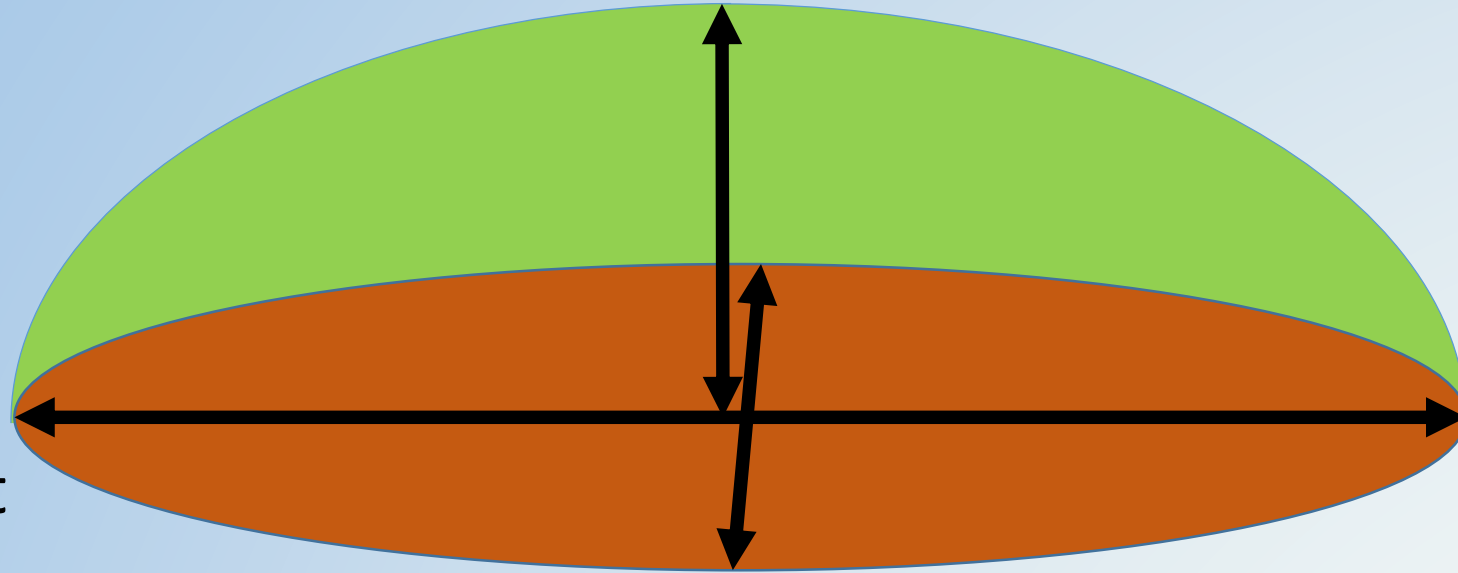
Pull Test

- Measurements
 - Lift (height)
 - Canopy moved (areal extent)



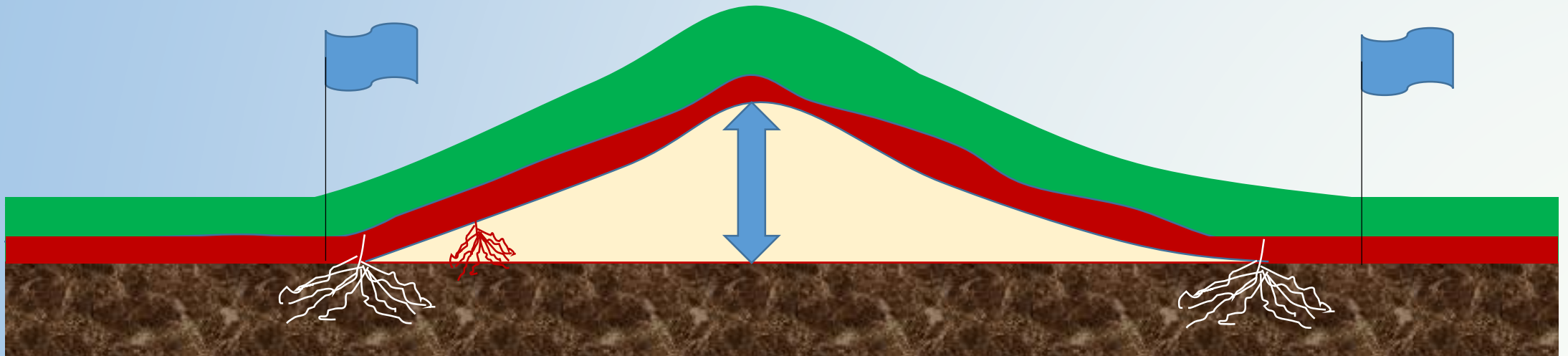
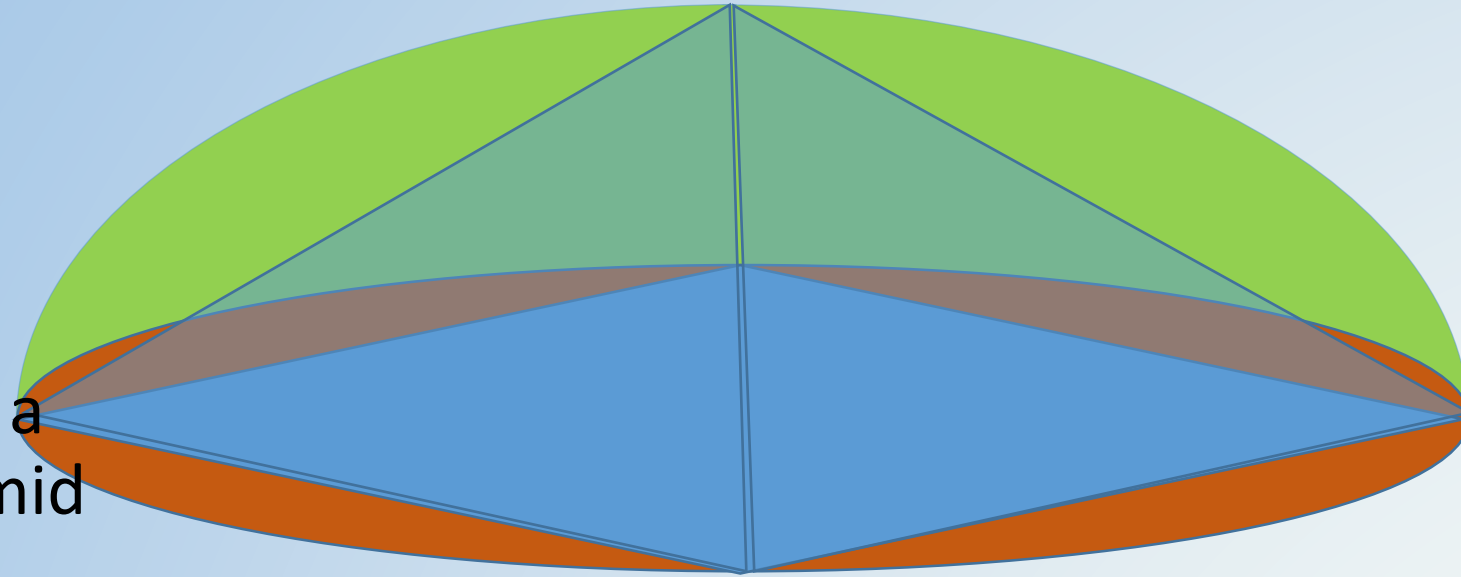
Pull Test

- Measuring a volume not containing rooting point

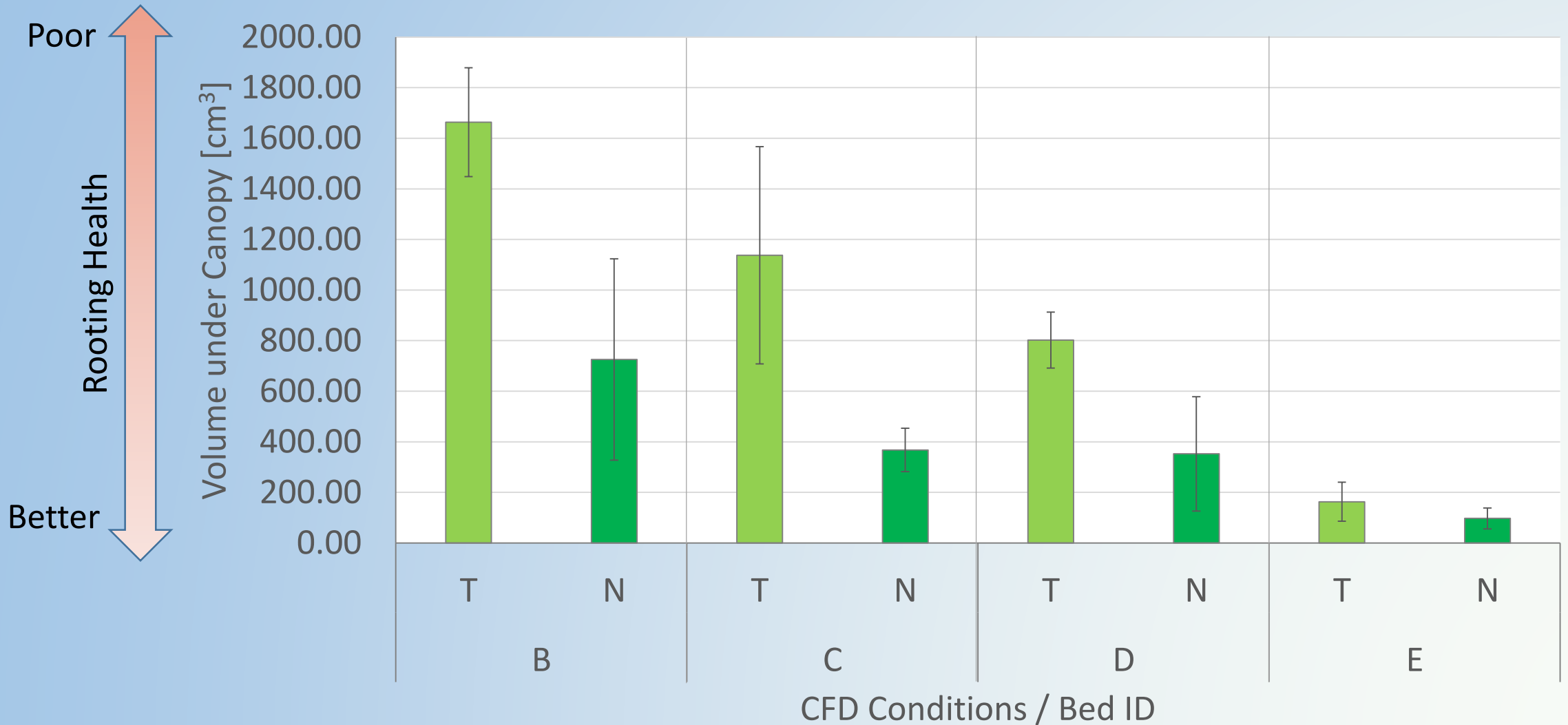


Pull Test

- Estimate the unrooted volume with a square pyramid



Root Health by Pull Test



Defining Root Health

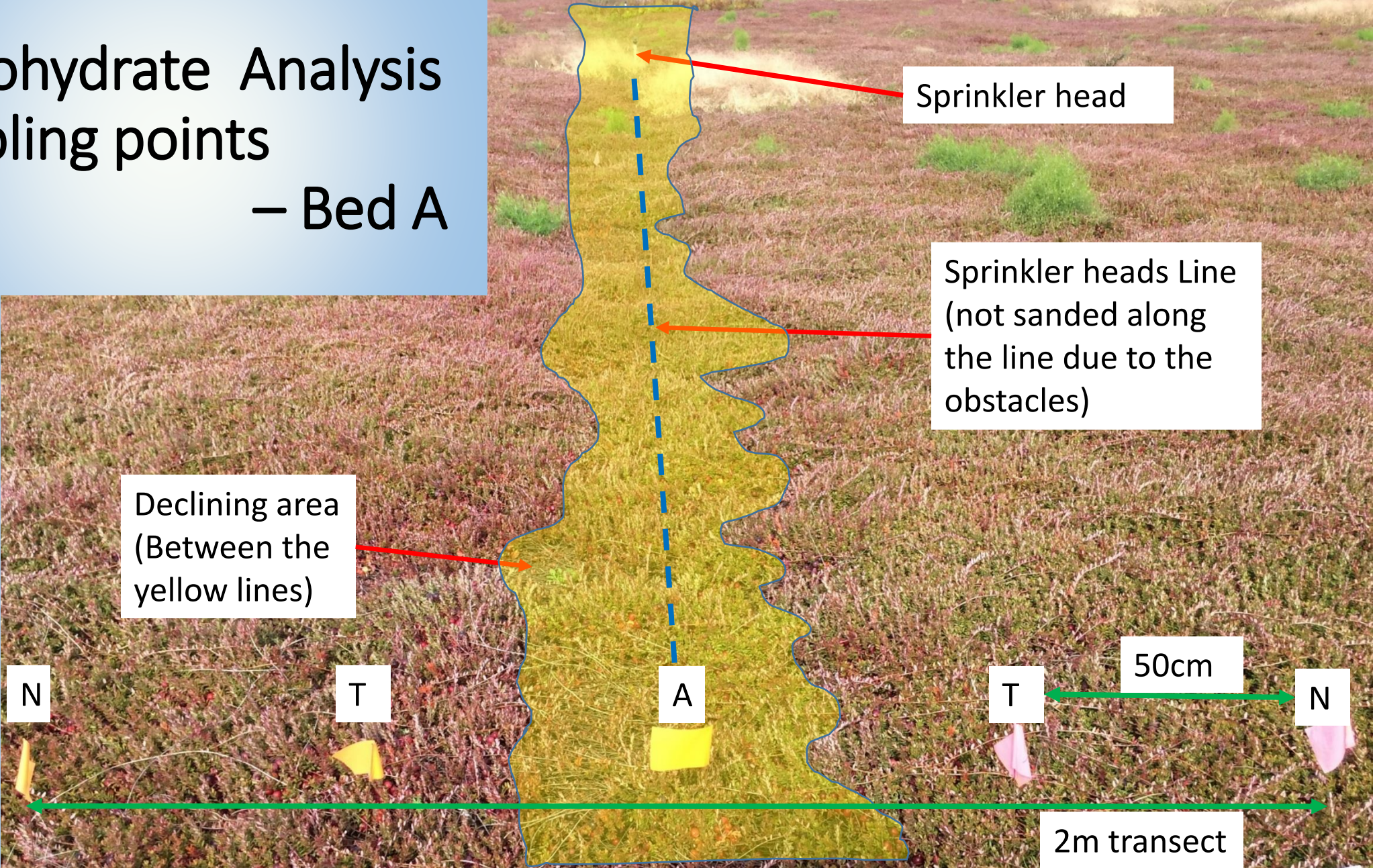
- Showed correlation with CFD condition
- High potential as a part of diagnostic tool

- Will repeat next year
- Establishment of standard chart (field test tool)

Obj1(b). Carbohydrate Analysis

- Result will be combined with the result of other plant and soil data
- To be evaluated as a benchmark for CFD diagnostic tool
- Progress:
 - Completed sampling (total 504 samples)
 - Currently processing samples (grinding samples)
 - Carbohydrate measurement is expected to start ~March 2017
- Sampling points layout
 - Transect method
 - Randomly chosen points along the boundary of dieback patches

Carbohydrate Analysis Sampling points – Bed A



Carbohydrate Analysis Sampling points

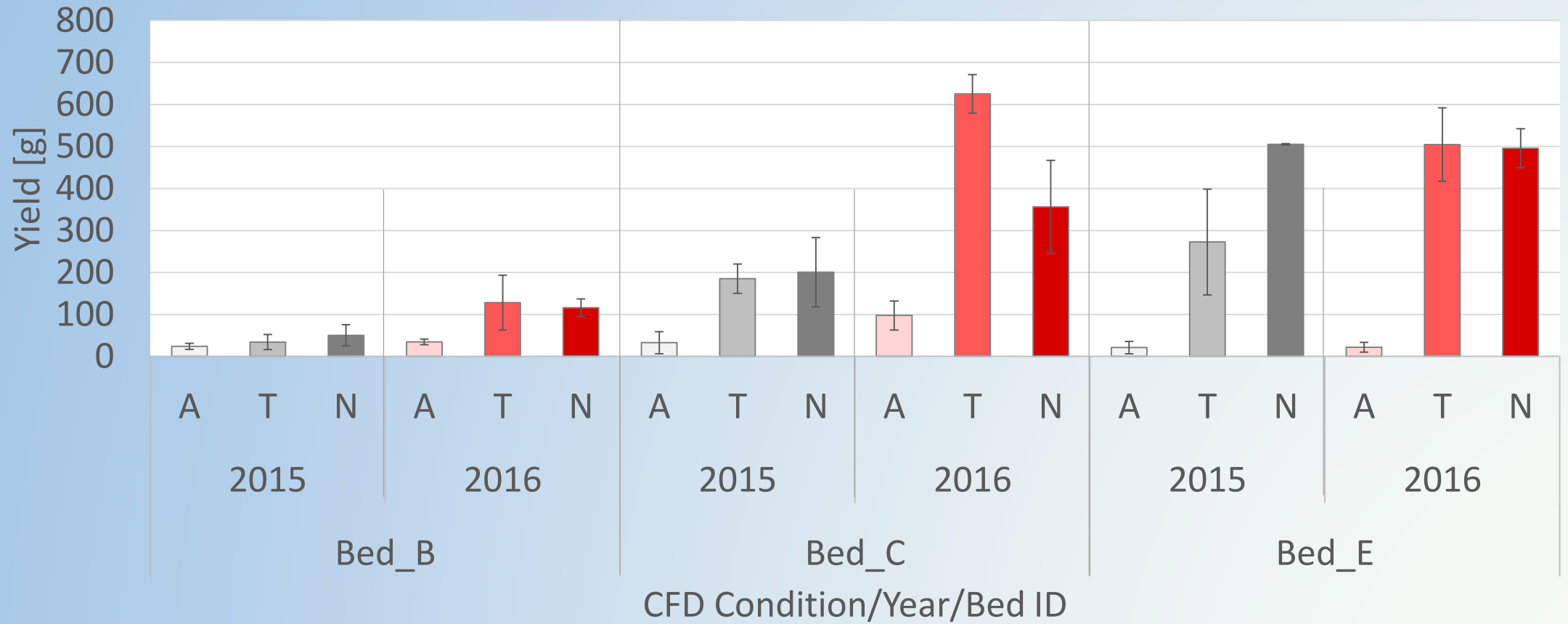
- Bed B (similar in other 3 beds)



Carbohydrate Analysis

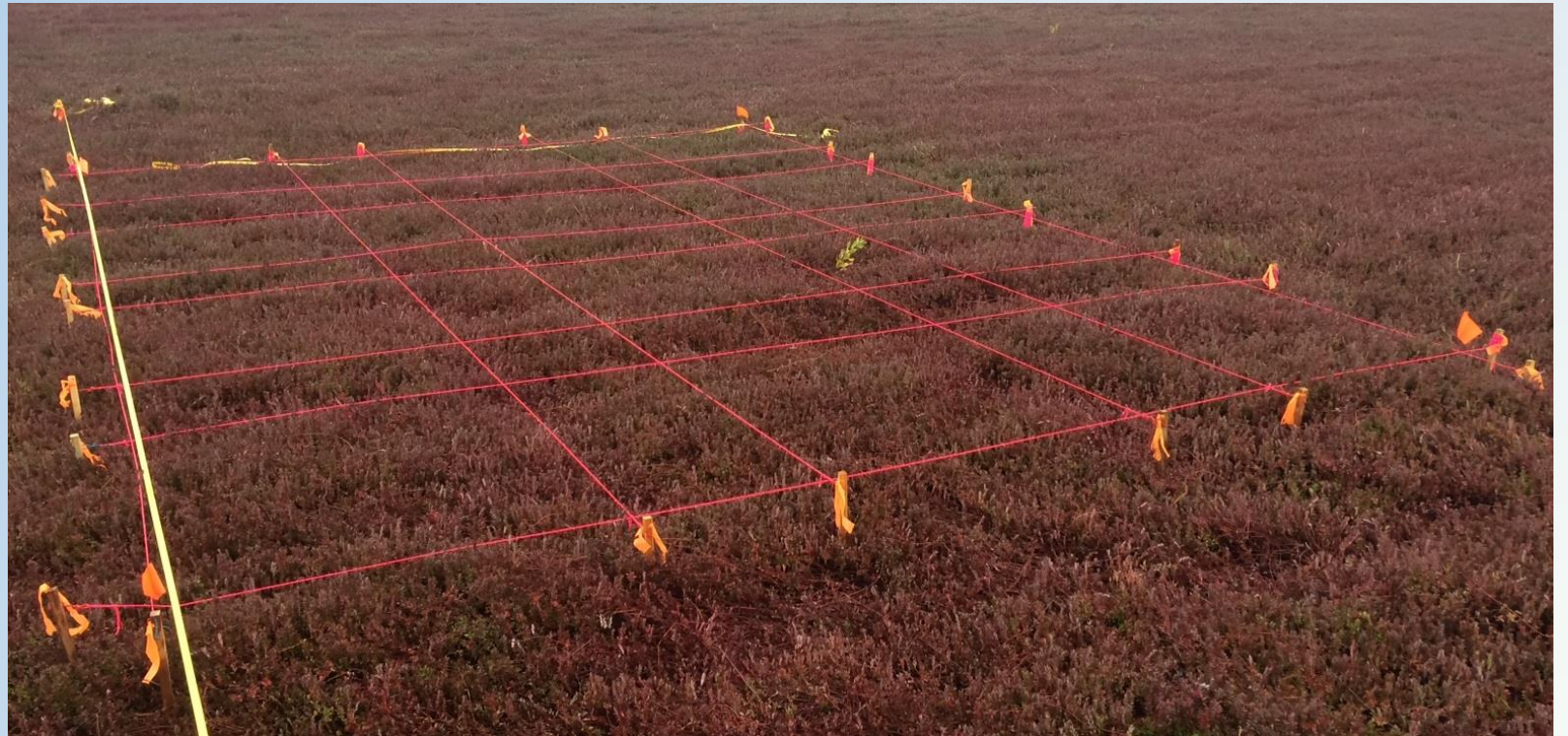


Yield Analysis (total weight)



Obj2(a). Management Trial

- 3 trials on 2 farms
 - 2 peat beds
 - 1 sawdust mixed
- 1m x 1m plot
- 0.5m buffer
- 4 replicates
- 3 sand treatments
 - 0, $\frac{1}{2}$, and 1 inch
- Impact of sand on canopy structure and yield will be collected in 2016 and 2017



Obj2(b). Renovation Trial

- Unable to setup trials for 2016
- Still interested in trials using incorporation of sawdust and sand in peat prior to planting

Obj2(c). Management Survey

- Survey sheet will be circulated in the early 2017 for 2016 season

Plans for 2017

- Repeat of similar measurements/tests/sampling in 2016
- Optimization of testing methods
- Starting renovation trial
- 2nd season for the management trial plots
- Carbohydrate measurement with a high performance liquid chromatography (HPLC)
- Synthesis of data and analysis