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Soil Organic Carbon as the Basis for Assessment of Site Condition in Stands of Quaking Aspen

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I. Introduction

- Land managers need to be able to track site productivity changes based on past management
- Site quality assessments often extensive, expensive, specific, and confusing
- Soil Organic Carbon (SOC) = potential all encompassing indicator for site condition
- SOC central to healthy soil functions which contribute to a healthy site
- Research done in context of stands of Aspen (*Populus tremuloides*) on Cedar Mountain

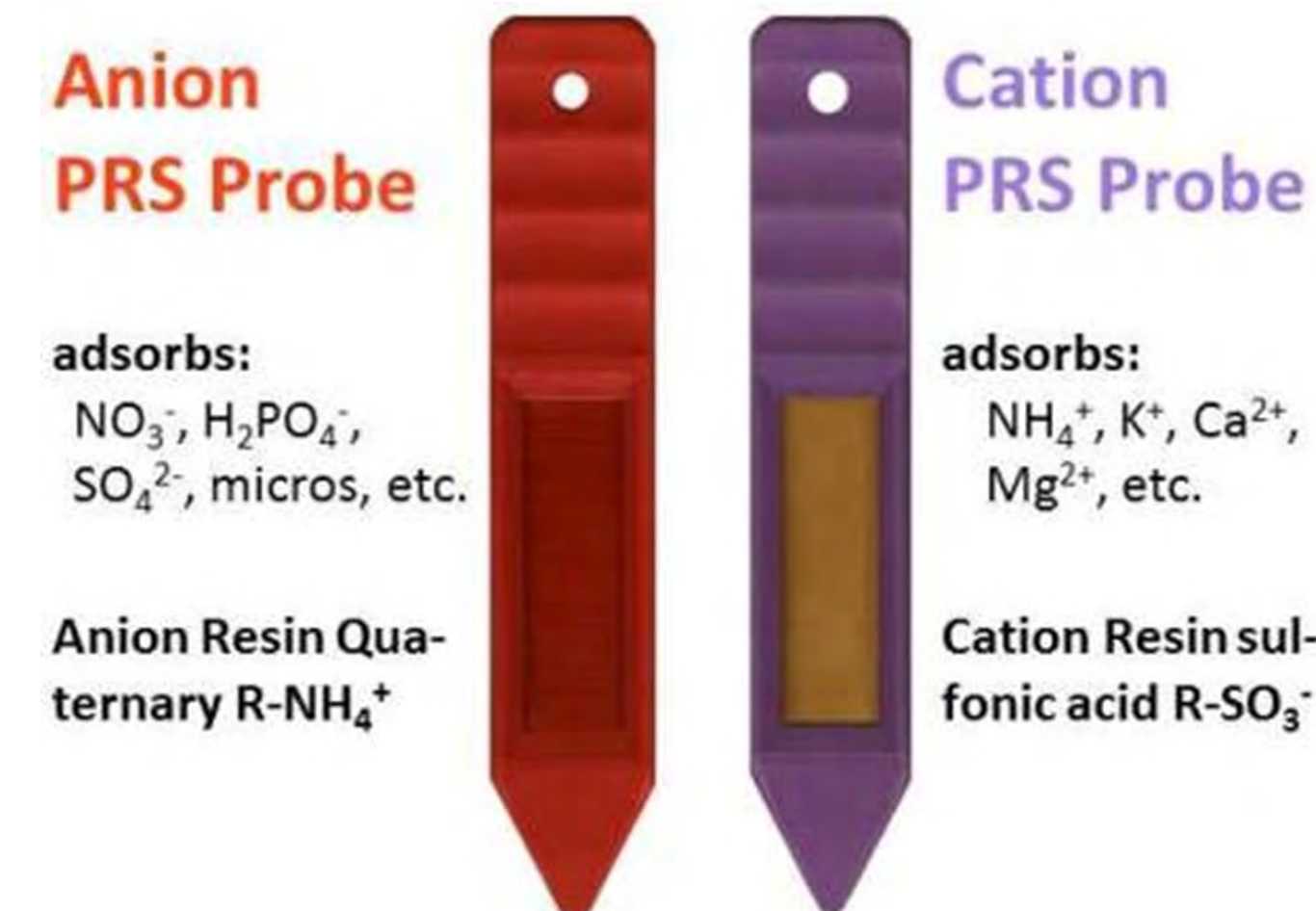
II. Methods

- Soils from 3 projects at 50 sites at different depths for a total of 92 samples
- Basic stand assessment carried out to determine overstory composition, stand condition, regeneration, etc.
- In-lab burial performed with Plant Root Simulators (PRS probes) to analyze various nutrient levels
- High temperature combustion of soil used to measure SOC concentrations

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III. Results

- Correlation between SOC concentration and nutrients levels mostly robust
- Significance values suggest strong relationship between SOC and nutrient levels
- Generally higher levels of SOC under Aspen stands

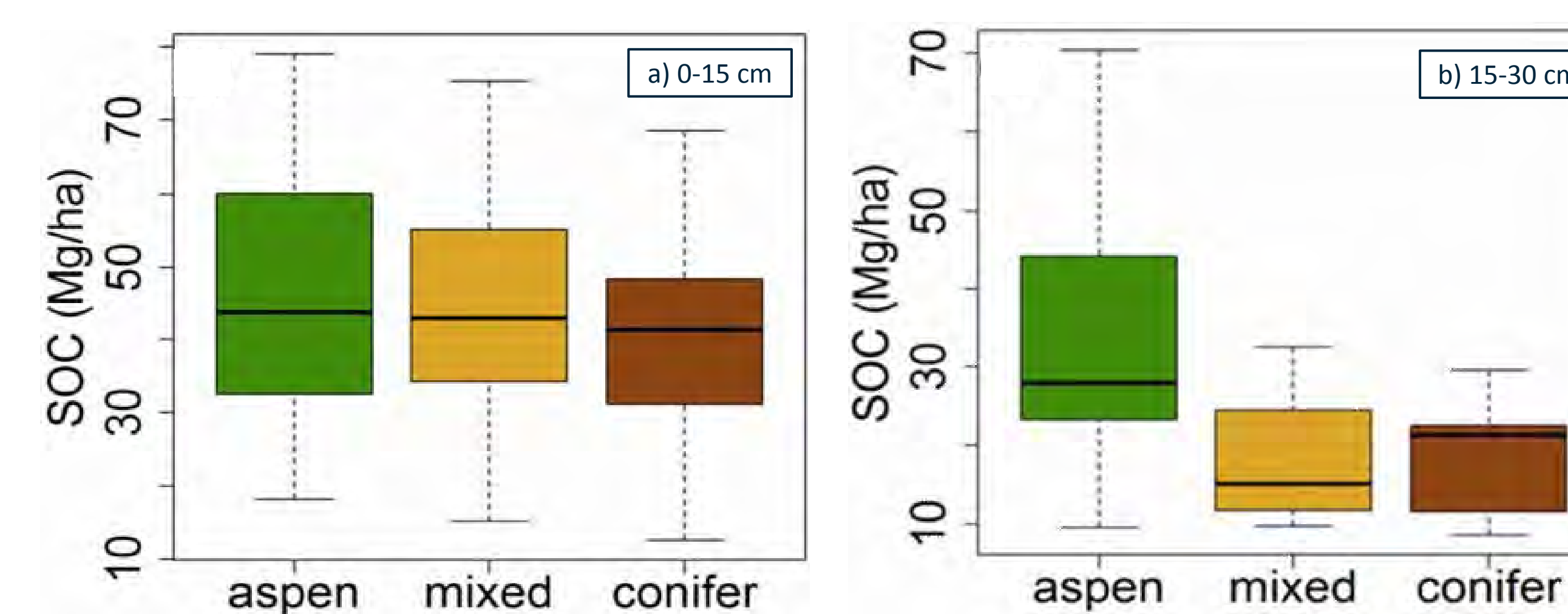


Figure 1 a-b: SOC Stocks at differing depths

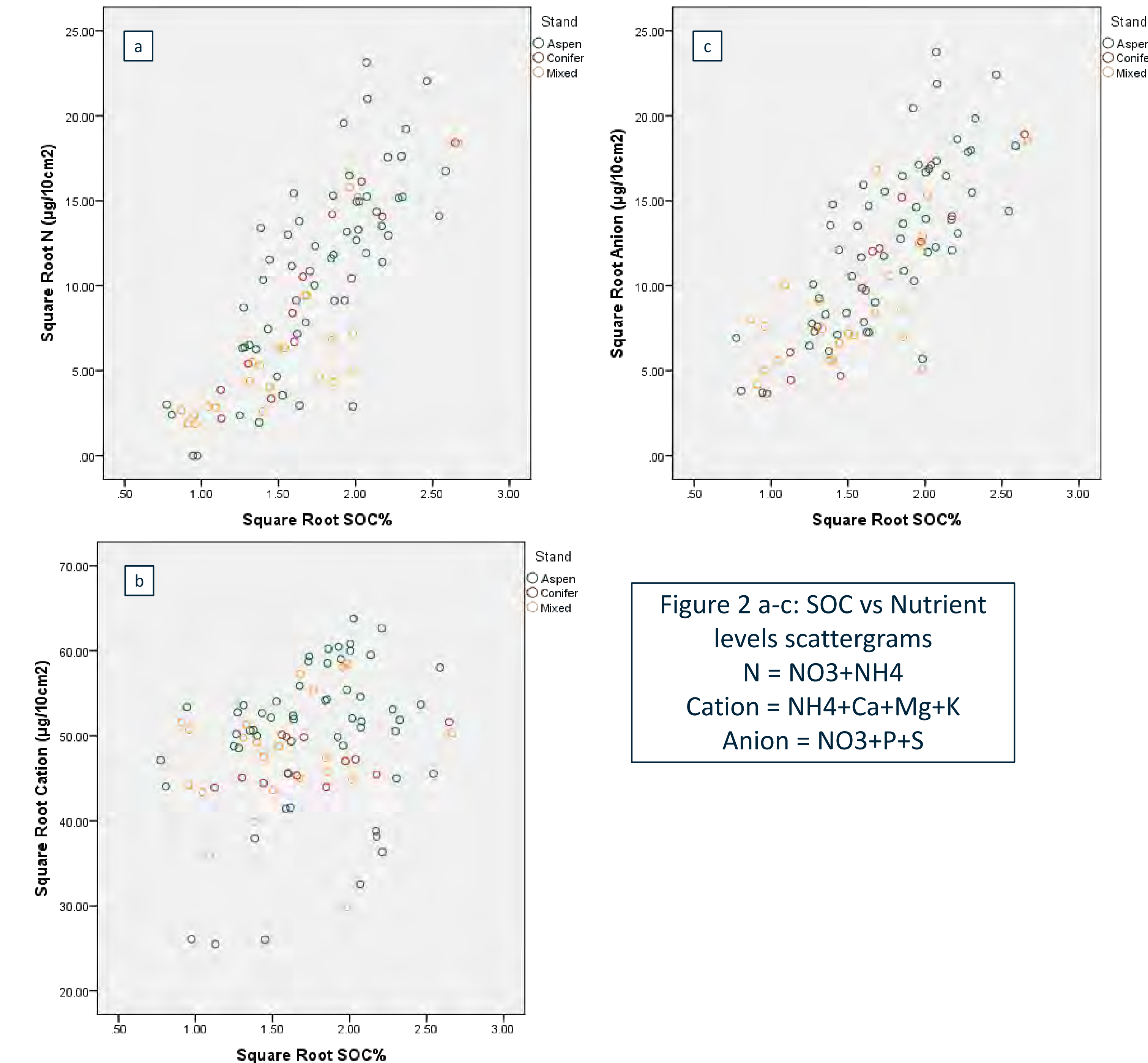


Figure 2 a-c: SOC vs Nutrient levels scattergrams
N = NO3+NH4
Cation = NH4+Ca+Mg+K
Anion = NO3+P+S

		Total N	Ca	Mg	K	P	S	Cation	Anion
SOC	Correlation	0.8	0.304	.200	-0.227	-0.292	.098	0.29	0.314
	Significance	.000	.003	.056	.030	.005	.353	.005	.002

Figure 3: SOC vs Nutrient Significance and Correlation values

IV. Discussion

- SOC = good indicator for soil fertility across differing overstory makeup
- Aspen and its potential to sequester carbon
- Further Analysis
 - SOC and Regeneration
 - Different types of available soil carbon
 - Stand characteristics and Carbon/Nutrient availability

Study conducted with funding from the Cedar Mountain Initiative