Field Estimations of Soil Organic Carbon

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Field Estimations of Soil Properties

- Redoximorphic Features
- Soil Texture
- Soil Organic Carbon
  - Mineral soil materials
  - Mucky modified soil materials
  - Organic soil materials

Field Indicators of Hydric Soils

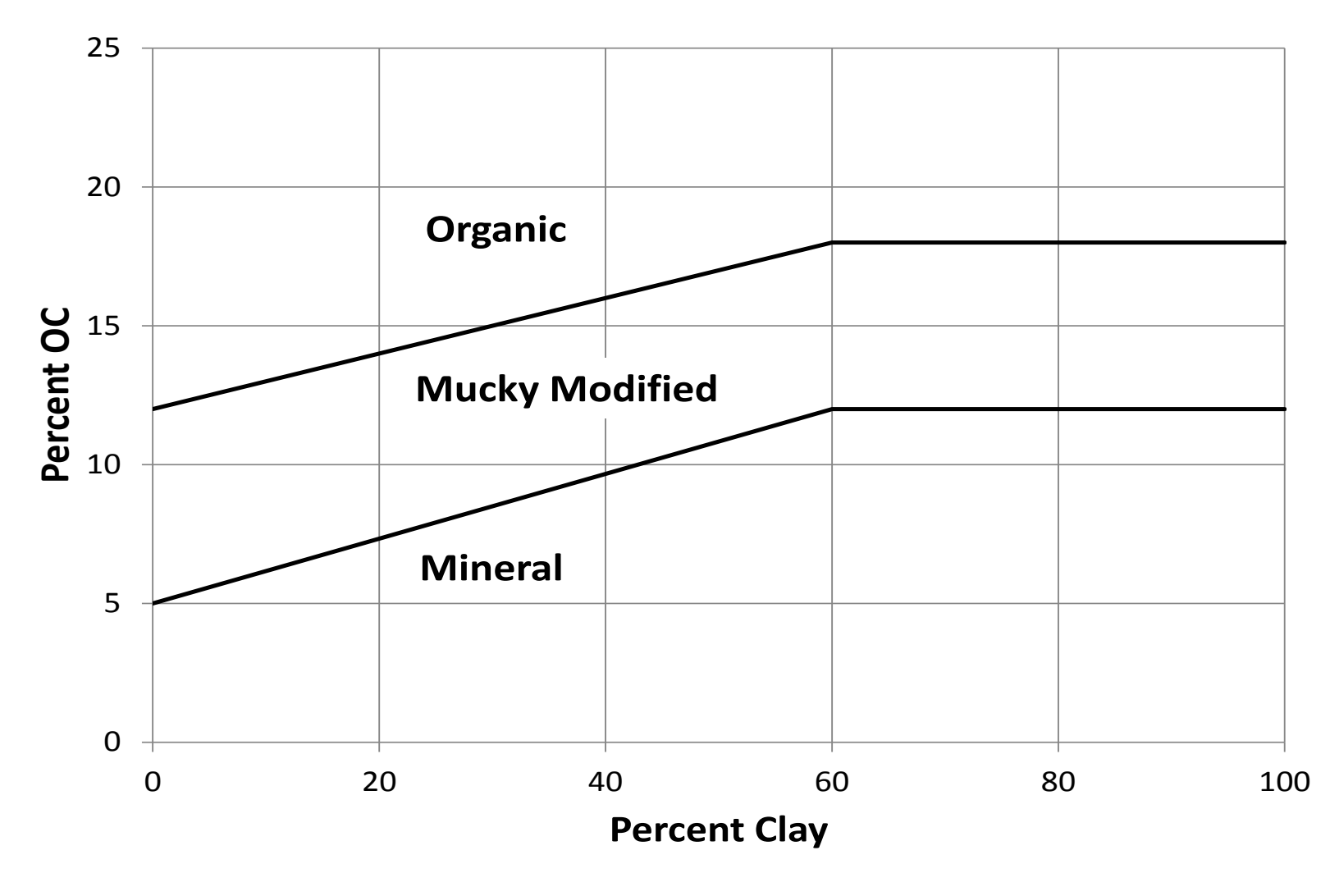
- Thirteen of the approved field indicators of hydric soils (A1, A2, A3, A5, A6, A7, A8, A9, A10, S1, S2, S3, F1) require the recognition of organic or mucky modified materials as part of their definition.

We Asked:

- How well can this be done?

Methodology

- Two parallel studies
- One utilized members and participants in the Mid-Atlantic Hydric Soils committee
- The second utilized members of the New England Hydric Soils Committee
- These groups were selected because they mainly included experienced soil and wetland scientists who had some experience in making distinctions among mineral, mucky mineral, and organic soil materials.

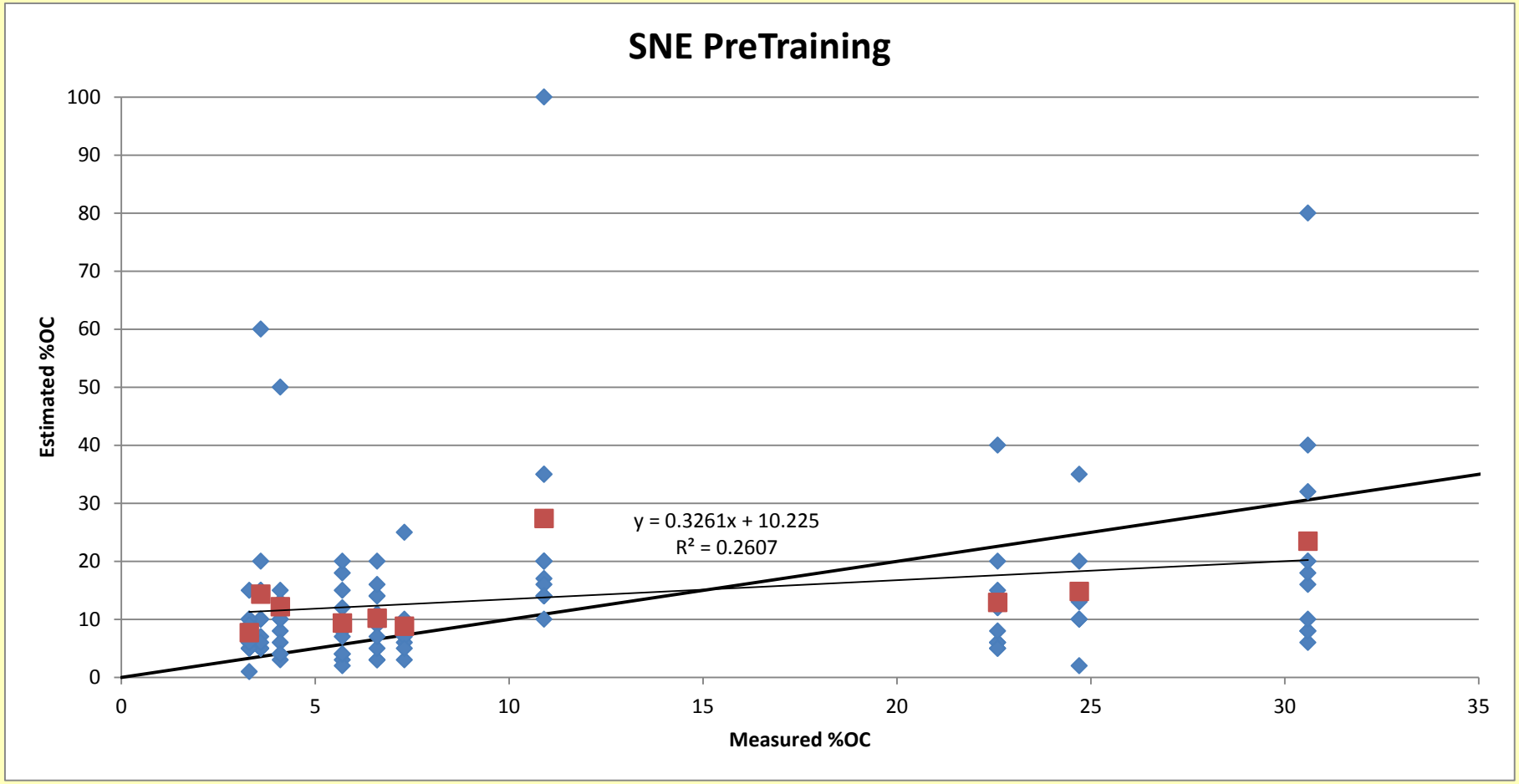


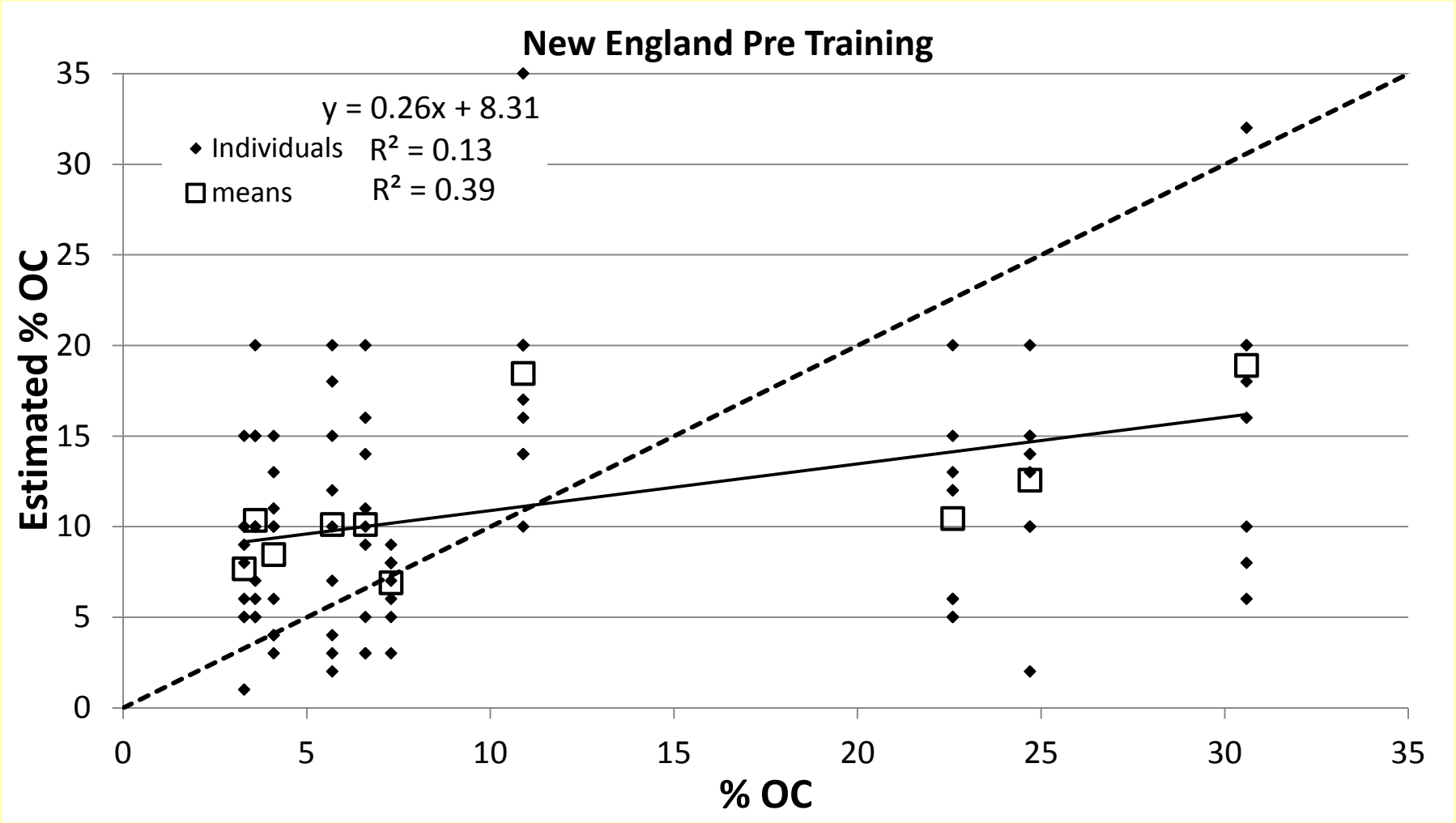
USDA-NRCS. 2010. Field Indicators of Hydric Soils in the United States, Version 7.0. USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils.

Pre-Training and Post-Training

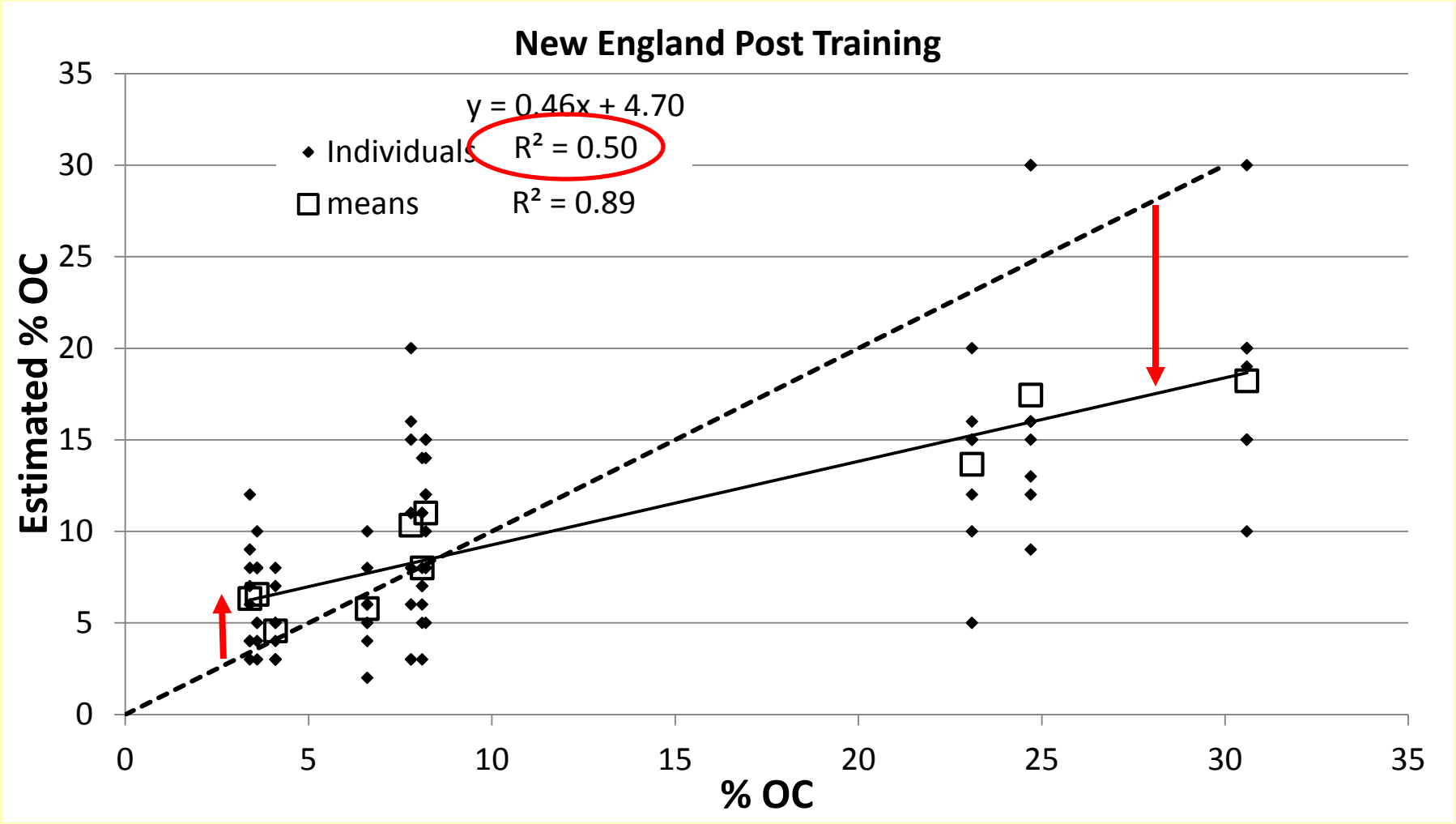
Sample ID	Location	SOC content (%)	Mineral	Mucky Mineral	Organic
1	NH				
2	RI				
3	MA				
4	MA				
5	RI				
6	MA				
7	NH				
8	MA				
9	RI				
10	MA				

the same 11 people participated in both pre and post


SNE PreTraining
Estimated %OC
Measured %OC
y = 0.3261x + 10.225
R² = 0.2607
0
10
20
30
40
50
60
70
80
90
100
0
5
10
15
20
25
30
35


New England Pre Training
y = 0.26x + 8.31
Individuals R² = 0.13
means R² = 0.39
Estimated % OC
% OC
0
5
10
15
20
25
30
35

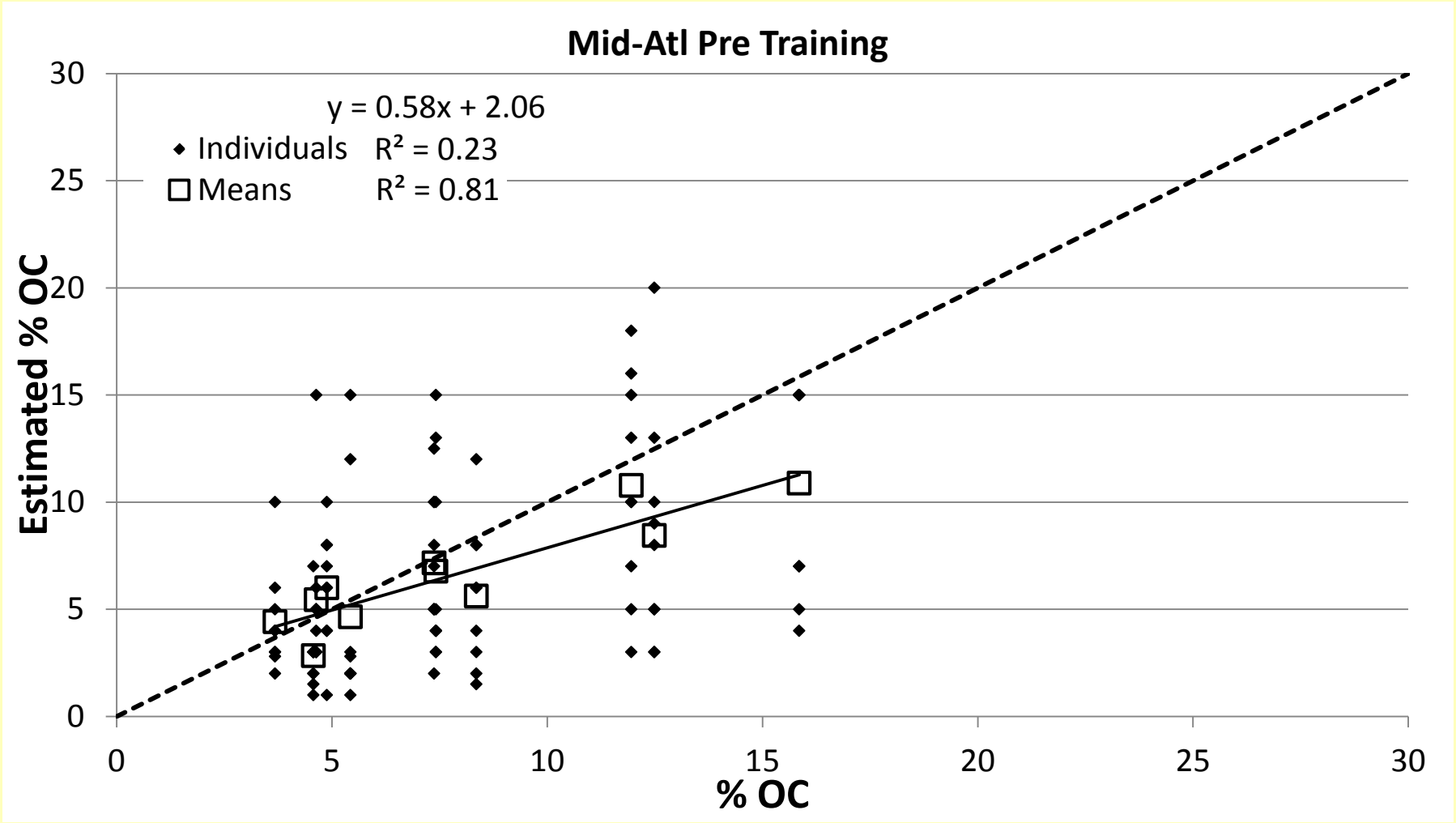
$p < 0.001$


New England Post Training
y = 0.46x + 4.70
R² = 0.50
R² = 0.89
Individuals
means
Estimated % OC
% OC
0
5
10
15
20
25
30
35

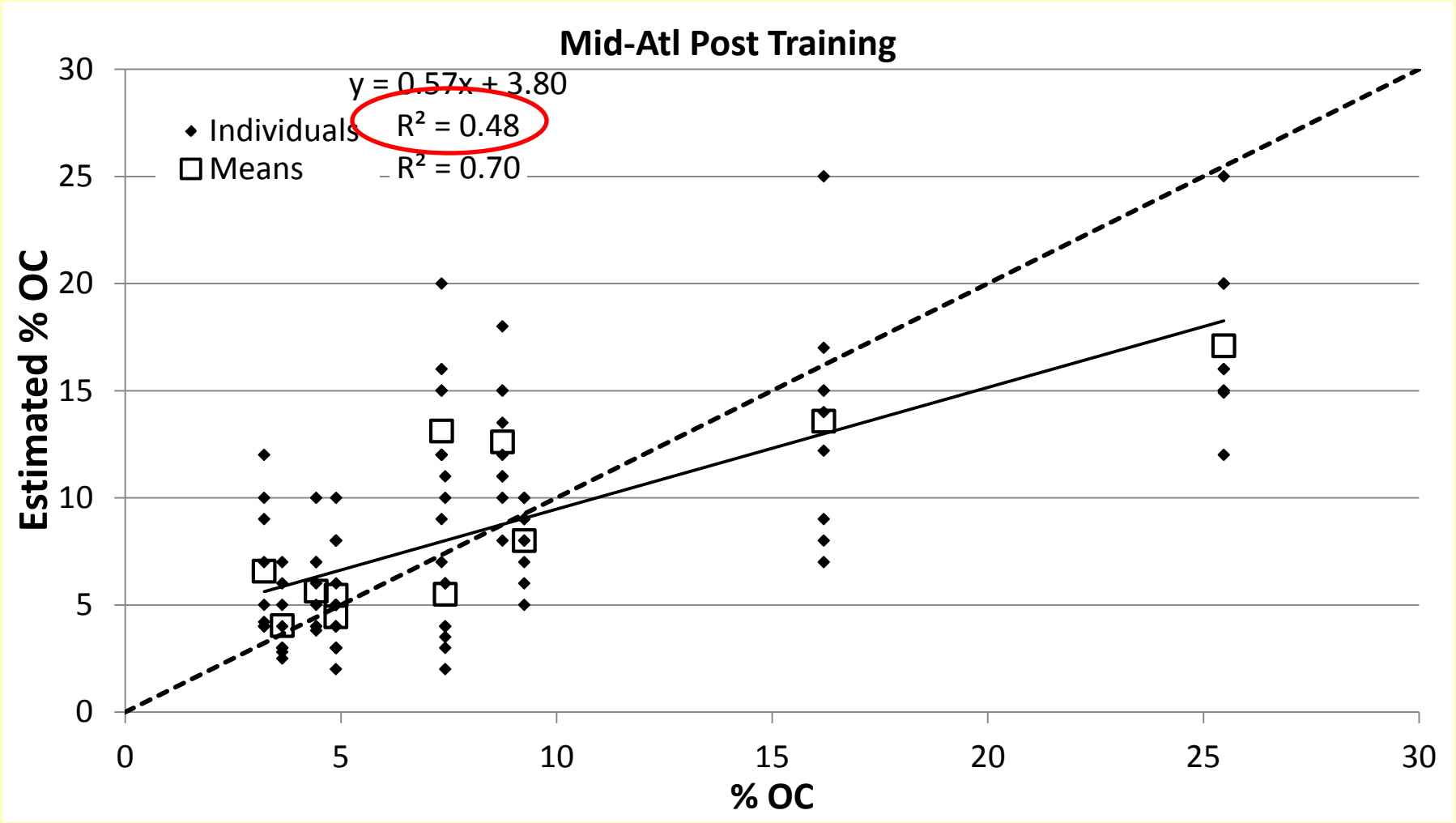
$p < 0.001$

New England Class Assignment Results

Participant	A	B	C	D	E	F	G	H	I	J	K	Average correct (%)
Pre-training Correct (%)	60	50	60	30	30	40	40	50	30	20	40	41%
After training Correct (%)	70	80	50	50	60	100	50	70	70	70	80	68%
Individual Improvement (%)	10	30	-10	20	30	60	10	20	40	50	40	27%


Mid-Atl Pre Training
y = 0.58x + 2.06
Individuals R² = 0.23
Means R² = 0.81
Estimated % OC
% OC
0
5
10
15
20
25
30

$p < 0.001$

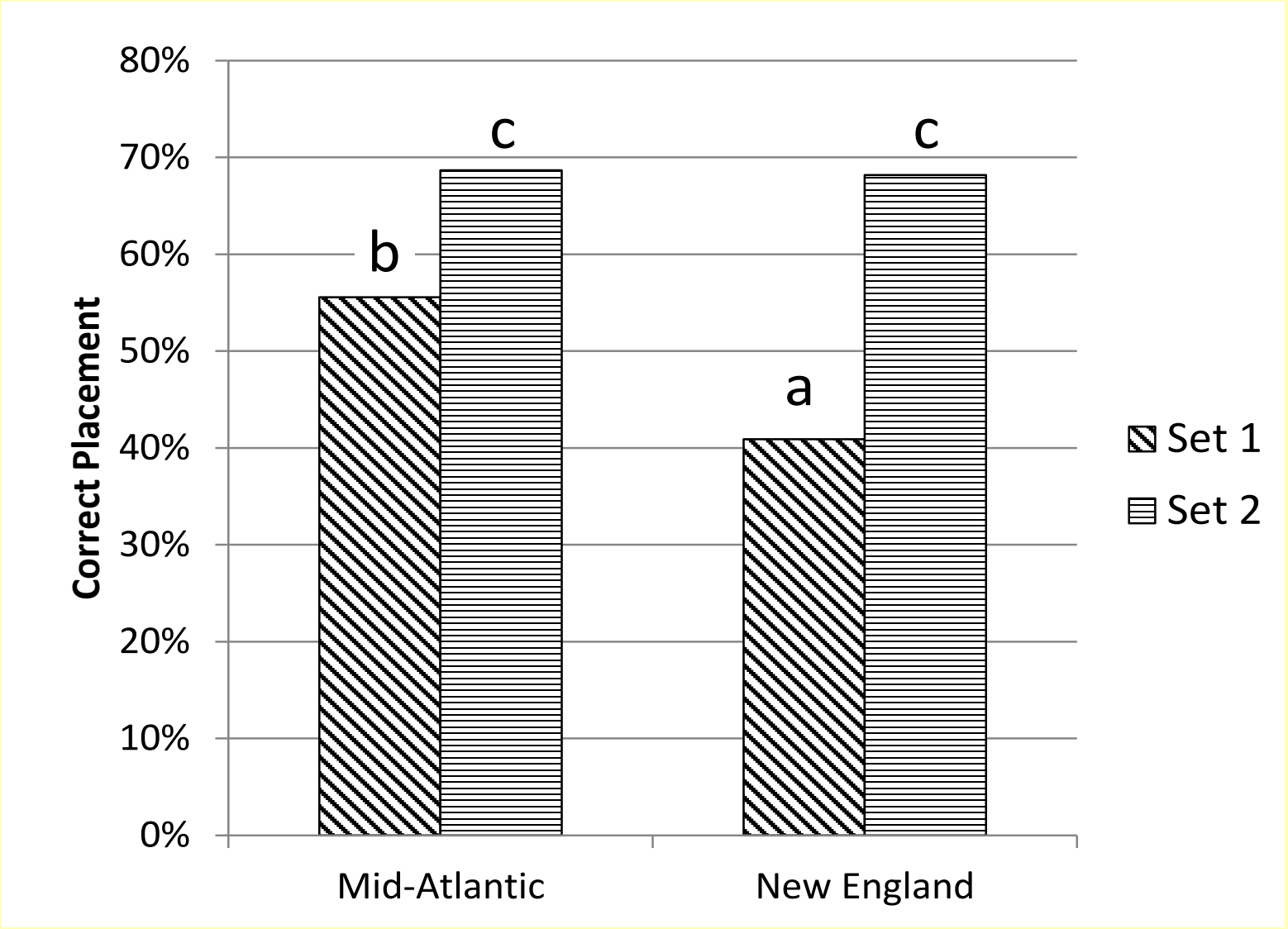

Mid-Atl Post Training
y = 0.57x + 3.80
R² = 0.48
R² = 0.70
Individuals
Means
Estimated % OC
% OC
0
5
10
15
20
25
30

$p < 0.001$

Mid-Atlantic Class Assignment Results

Participant	A	B	C	D	E	F	G	H	I	average correct
Pretraining Correct	45%	55%	36%	45%	73%	64%	64%	45%	73%	56%
Aftertraining Correct	73%	55%	45%	55%	73%	91%	82%	64%	82%	69%
Individual Improvement	27%	0%	9%	9%	0%	27%	18%	18%	9%	

Placement into classes: mineral, mucky modified, organic



Summary

- Not easy to estimate SOC and determine between mucky modified and mineral or organic soil materials

- Without training New England folks could only assign the correct class on average 41% of the time.

- Training improved our ability to assign the correct class (68%). This was essentially the same amount as the Mid-Atlantic committee got correct after training (69%)

- In general we over-estimate SOC in mineral soil materials and under-estimate SOC in organic soil materials.