Improving K fertilizer recommendations for corn on the Delmarva Peninsula and Coastal Plain of Virginia

FRST Monthly Meeting

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VIRGINIA AGRICULTURAL EXPERIMENT STATION
EASTERN SHORE AGRICULTURAL RESEARCH AND EXTENSION CENTER
VIRGINIA TECH

Project Objectives

- Revaluate soil test fertilizer recommendation guidelines.

Soil Series	Soil Mgt Group	Corn
Bojac (ES, VA Beach, Ches.)	T	IIIb
Bojac (Mainland, excluding VA Beach & Ches.)	DD	IVb

Fig. 2. Current soil test fertilizer recommendations for the Virginia Tech Soil Testing Laboratory.

Fig. 1. Current Mehlich-1 soil test concentration ranges for the Virginia Tech Soil Testing Laboratory.

Ext. K	K - lb/A	K - ppm	K_2O - lb/A
L-	0-15	0-8	0-18
L	16-55	8-28	19-66
L+	56-75	28-38	68-90
M-	76-100	38-50	92-121
M	101-150	51-75	122-181
M+	151-175	76-88	182-211
H-	176-210	88-105	212-253
H	211-280	106-140	254-337
H+	281-310	141-155	339-373
VH	310+	155+	373+

Crop: Corn for Grain (No-Till or Conventional) **VALUES Crop Code**: 1, 2, 401, 402

Target pH = 6.2 See Notes: 1, 2, (4, 5)

Possible Trace Element Need: Zn (see page 8)

Soil Productivity Groups I, II

Soil Test Level	Fertilizer Recommendations (lb/A)		
	N	P_2O_5	K_2O
L	1 lb. of N/Bu of expected yield	100 - 140	100 - 140
M		60 - 100	60 - 100
H		20 - 60	20 - 60
VH		0	0

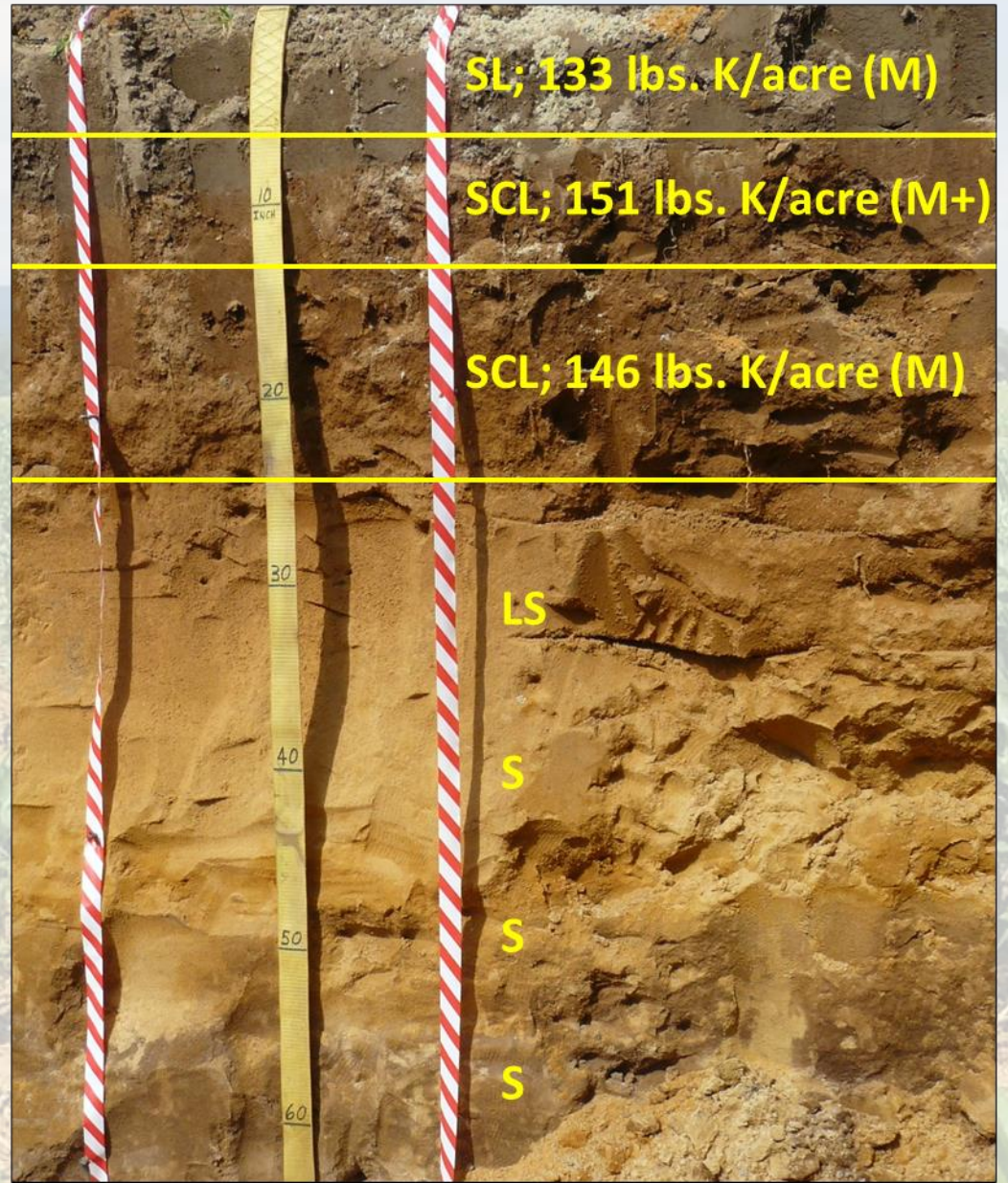
Soil Productivity Groups III, IV, V

Soil Test Level	Fertilizer Recommendations (lb/A)		
	N	P_2O_5	K_2O
L	1 lb. of N/Bu of expected yield	80 - 120	80 - 120
M		40 - 80	40 - 80
H		20 - 40	20 - 40
VH		0	0

Locations

- Summer 2021 project had two site locations in Eastern Virginia:
  - Eastern Shore AREC (Accomack).
    - Low+ soil test K
    - Medium soil test K
- On fields with a history of K deficiency.
  - Low organic matter (~0.5%).
  - Bojac sandy loam (~65% sand).
  - Hardpans (~12-inches deep).
  - Dryland.

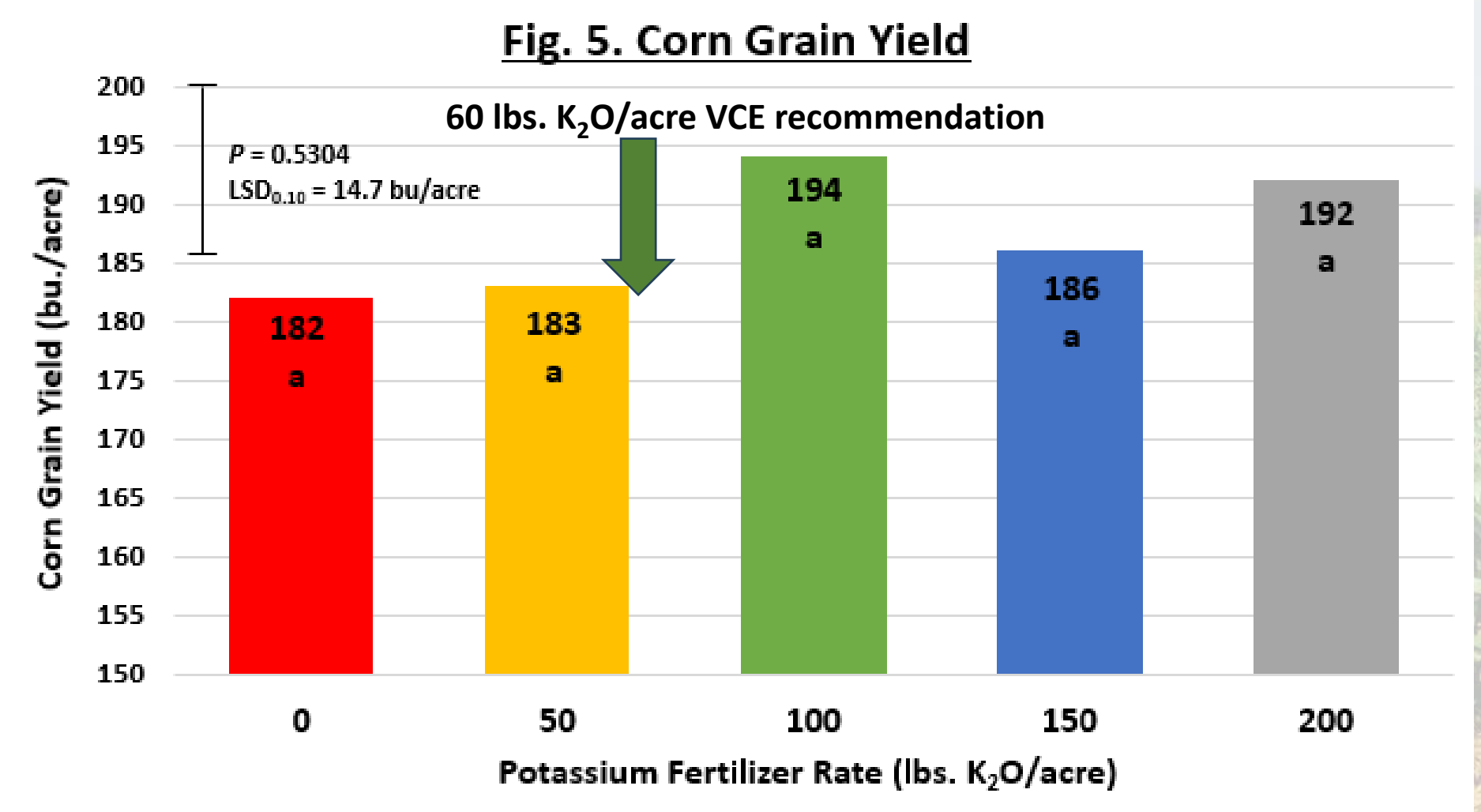
Fig. 3. Typical Bojac sandy loam soil description on the Eastern Shore.



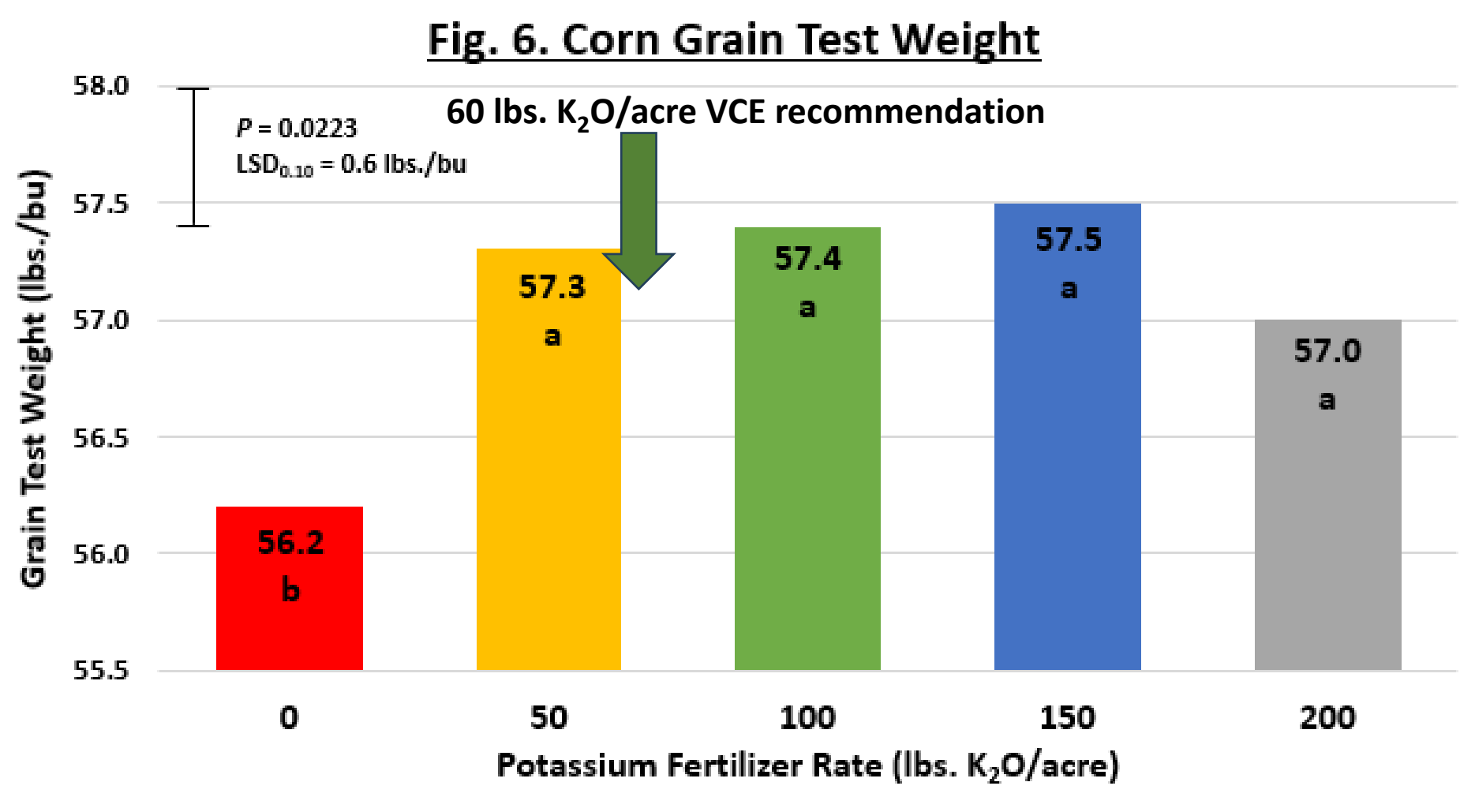
Project Treatments

- Four different potash rates plus a no-K control:
  - 0 lbs. K_2O/acre
  - 50 lbs. K_2O/acre
  - 100 lbs. K_2O/acre
  - 150 lbs. K_2O/acre
  - 200 lbs. K_2O/acre
- One application timing:
  - At-planting: 100% at-planting.
- Source: Muriate of Potash (0-0-60).
- Nitrogen was supplemented with urea to reach a total of 200 lbs. N/ac.
  - Applied 50 lbs. N/ac. at-planting
  - 150 lbs. N/ac. at V6.
- Phosphorus was broadcast applied at 60 lbs. P_2O_5/acre

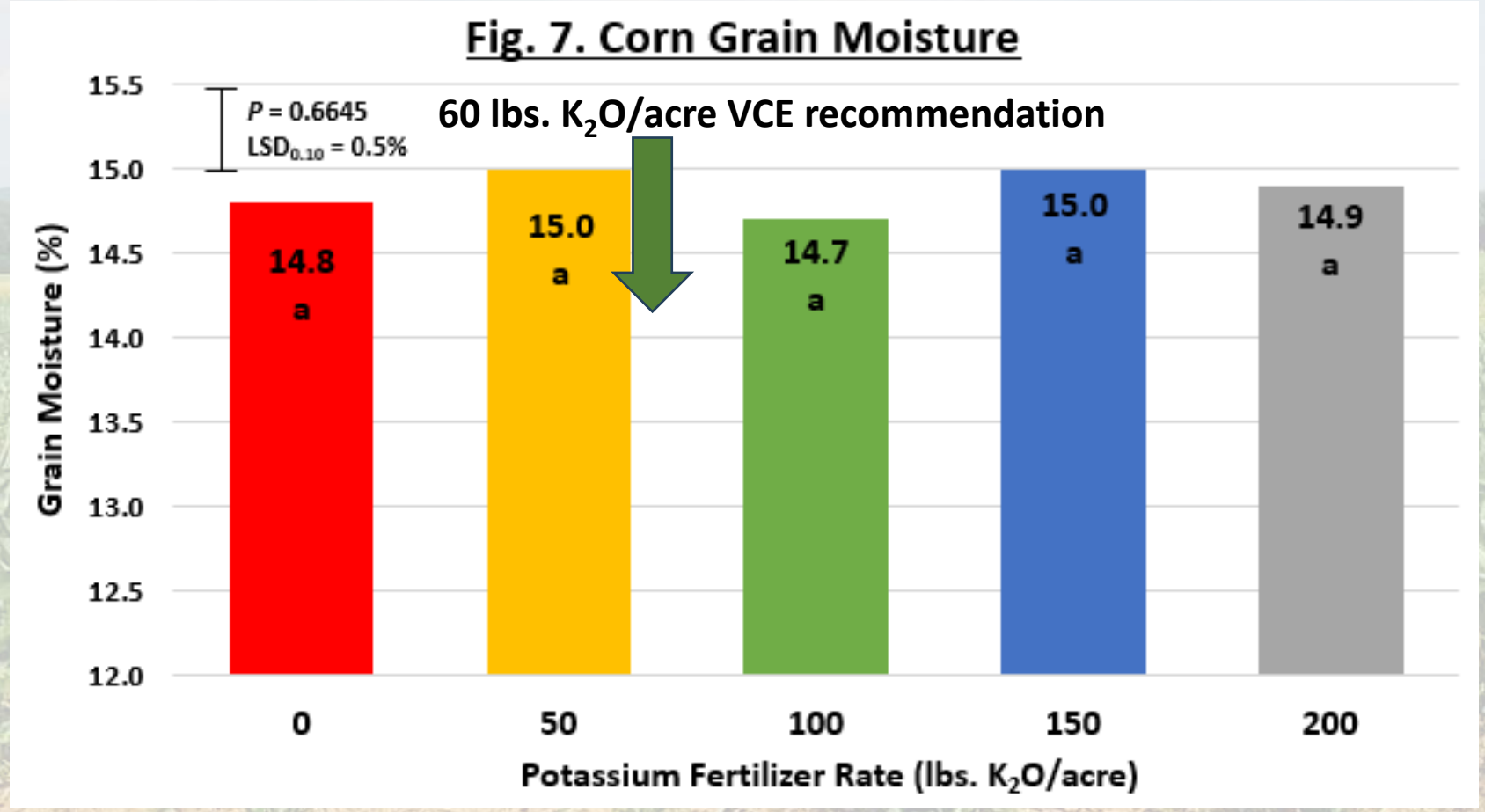
Results: Corn Yield



Results: Corn Grain Test Weight



Results: Corn Grain Test Weight



Conclusions :

- With an average yield of 187.4 bu./acre (http://www.ipni.net/article/IPNI-3296):
  - 262 lbs. K_2O is taken up within the corn plant over the growing season
  - 47 lbs. K_2O would be removed in the corn grain
- According to Virginia soil test guidelines, a medium testing soil recommended 60 lbs. K_2O/acre, so a net gain in soil test K would result.
- In Virginia, research demonstrated that 12-inch samples may be more suitable for soybean fertilizer response prediction than 6-inch deep soil samples. The same may be true for corn?
  - For instance, M+ = 40 lbs. K_2O/acre VCE recommendation

Thank you!

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