NO-TILL CORN RESPONSE TO POTASSIUM (K) FERTILIZATION

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Introduction

- Frequent reports of K deficiency.
- More often seen in no-till.
- Do current soil test K recommendations need modification?
- Does starter fertilizer containing K prevent deficiencies?

Procedure

- Long-term plots with wide range of soil test K (VL to EH, 60 to 265 ppm).
- Response to NPK starter (100/9-23-30) across range of soil test K levels.
- Corn yield responses measured over 4 yr.

Soil test K interpretation for corn (Group B soils)

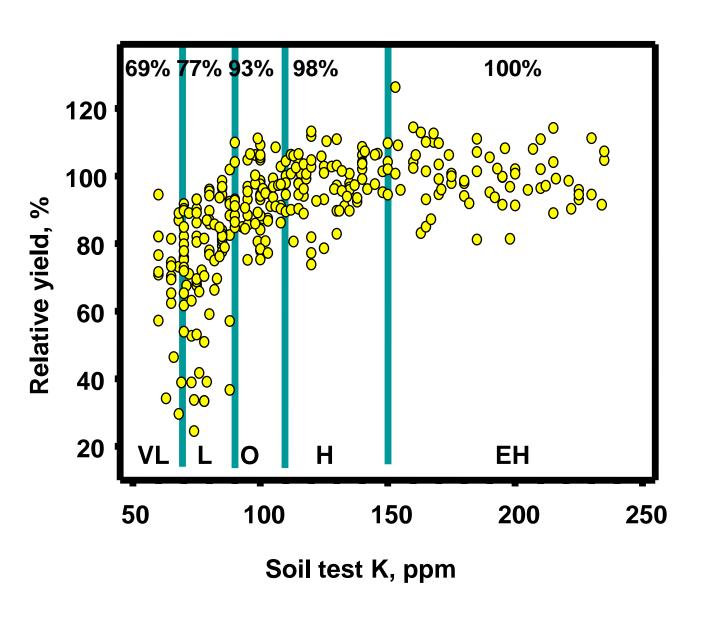
| | Soil test K | Recom.* | |
|---------------|-------------|----------------------------|--|
| Category | (ppm) | (lb K ₂ O/acre) | |
| V. low (VL) | < 70 | 100 | |
| Low (L) | 70-90 | 90 | |
| Optimum (O) | 91-110 | 60 | |
| High (H) | 111-150 30 | | |
| Ex. high (EH) | > 150 | > 150 0 | |
| | | | |

^{* 151-170} bu/acre yield goal.

Procedure

- 1993 to 1996.
- P and K broadcast to some plots (1993 & 1995 spring disked & chisel plowed) to expand the range of soil test levels.
- No-till in 1994 and 1996.

Soil K response relationship relative to current soil test interpretation ranges at Arlington, 1993 to 1996

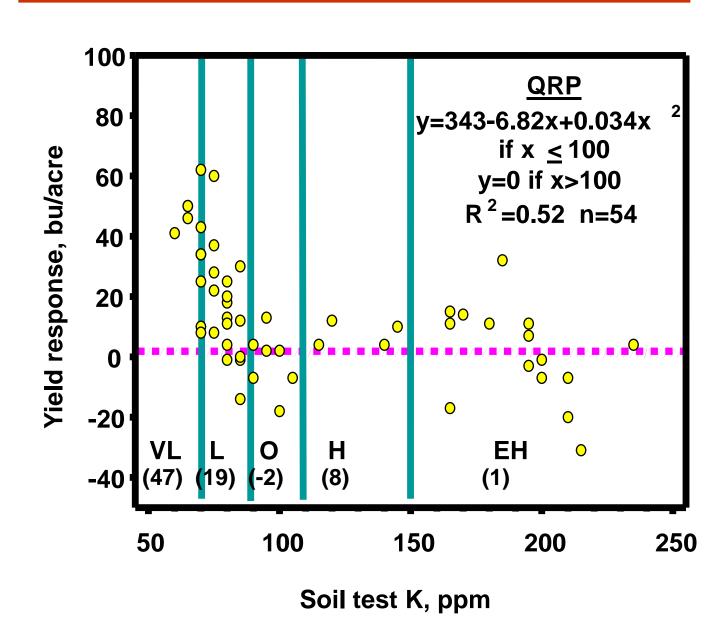


Growing season characteristics

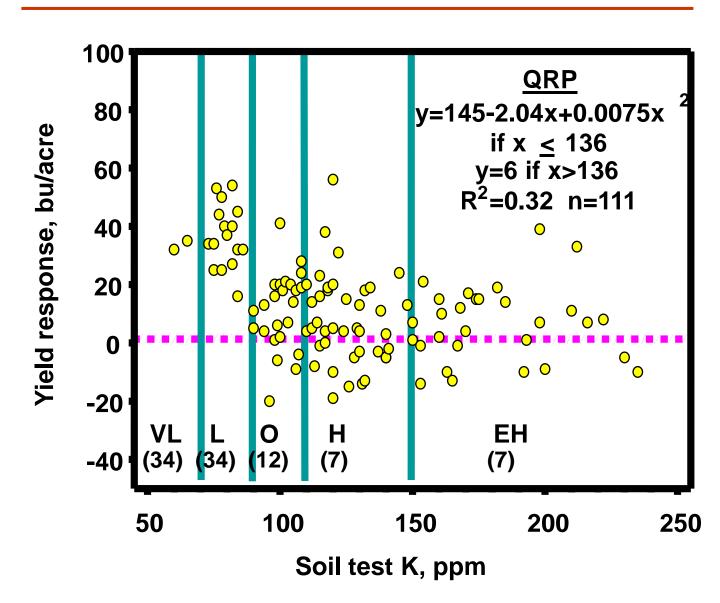
| Year | PDRM* | F.F. days | GDD |
|------|-------|--------------|------|
| 1993 | 225 | 154 | 2055 |
| 1994 | 228 | 189 | 2293 |
| 1995 | 227 | 145 | 2413 |
| 1996 | 228 | 170 | 2043 |
| | | | |

^{*} Planting dates: Apr. 30 to May 3; RM=105

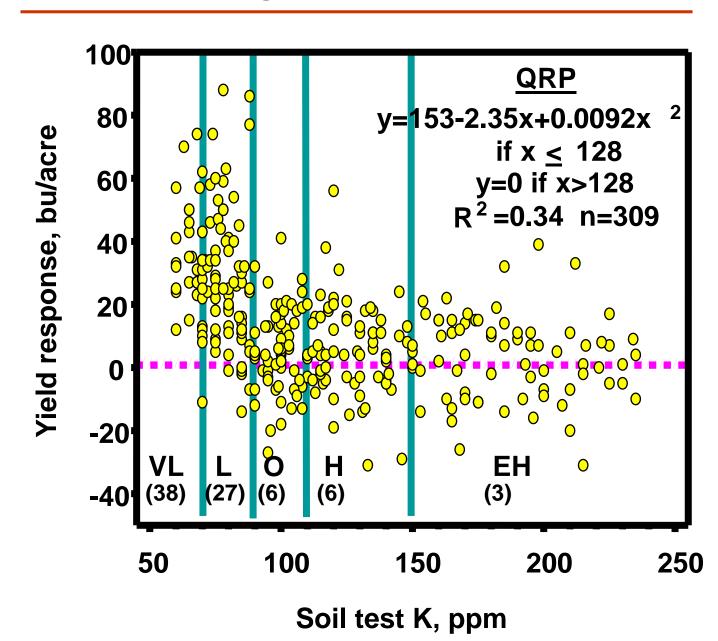
Relationship between soil test K level and yield response to starter fertilizer at Arlington, 1995



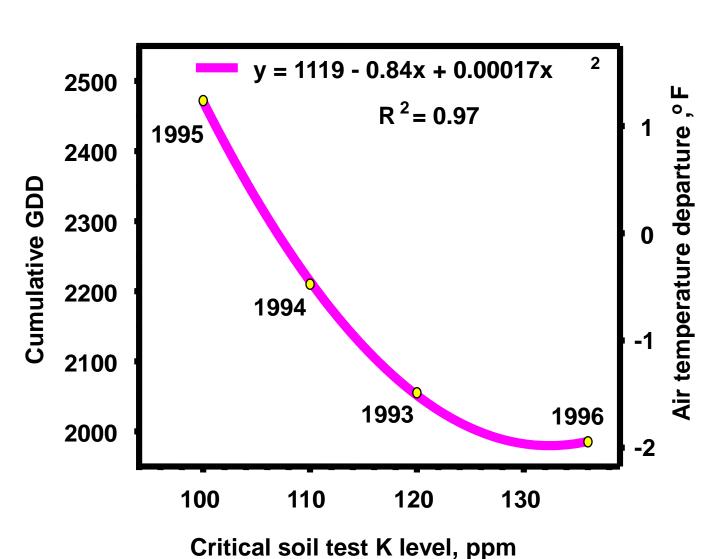
Relationship between soil test K level and yield response to starter fertilizer at Arlington, 1996



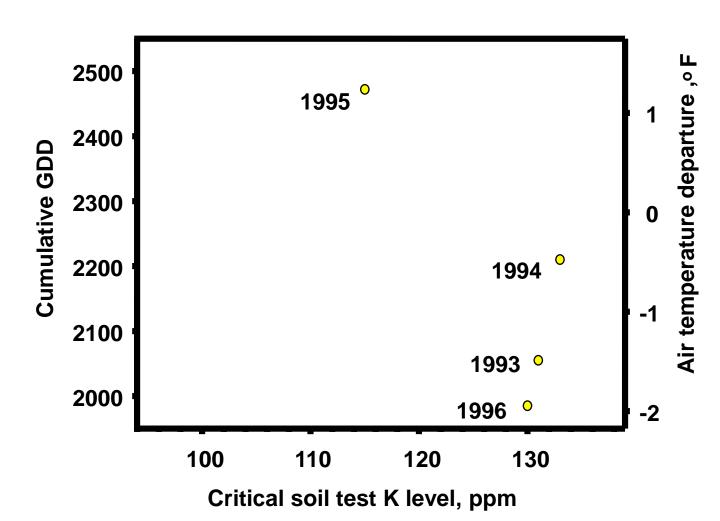
Relationship between soil test K level and yield response to starter fertilizer at Arlington, 1993 to 1996



Relationship between temperature (GDD and departure – May to September) and maximum soil test K level where yield response to starter fertilizer occurred



Relationship between temperature (GDD and departure – May to September) and maximum soil test K level where yield response occurred



Summary

- Results support the soil test K categories used for current K fert. recommendations.
- Little response to increasing soil test K above 110 ppm.
- Frequency and size of response to starter was influenced by GDD accumulation.
- Response to starter occurred at higher soil test K levels in cooler growing seasons