SIDEDRESSING NITROGEN: USEFUL ON ALL SOILS?

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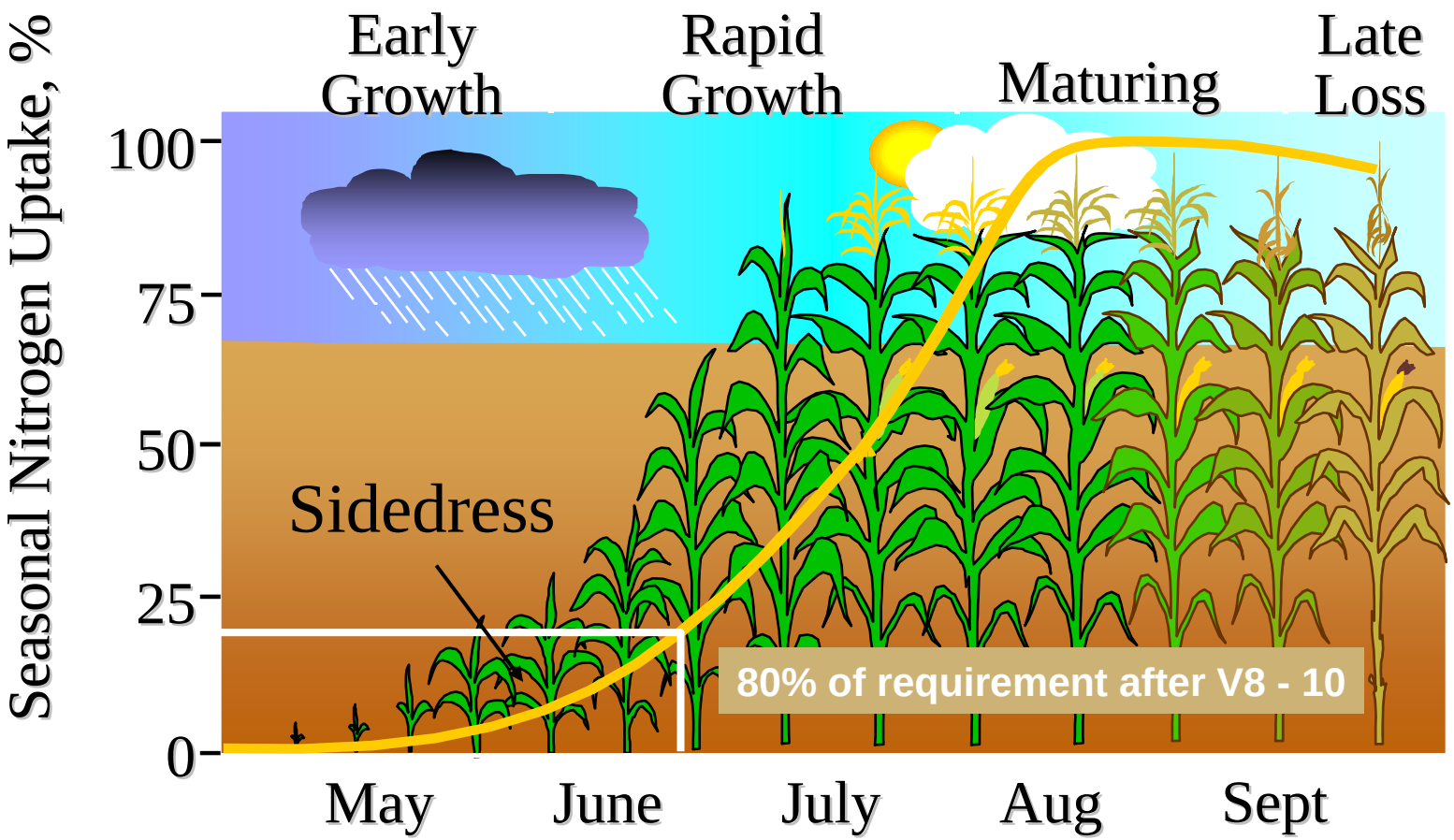
SIDEDRESSING N: USEFUL ON ALL SOILS?

- Early review of N timing effects (Bundy, 1986)
- Regional results from 1990's work
- Recent experiments with N timing
- Summary

Timing of Nitrogen Uptake by Corn



A. Blaylock, Agrium

Review of N timing research (1986)

- Sidedress N gave large benefits where the risk of N loss from preplant N was high
  - Loss mechanisms: Leaching or denitrification
  - e.g., sandy soils or wet soils
- Little benefit from sidedressing where losses were low
  - e.g., medium-textured, well-drained soils

Nitrogen rate and timing effects on corn yield and N recovery, Hancock,WI, 2003-2004

N rate	Yield (bu/acre)		N recovery (%)	
(lb/acre)	Preplant	Sidedress*	Preplant	Sidedress*
0	96	96	--	--
50	122	142	47	84
100	145	175	45	79
150	164	194	42	73
200	180	202	40	66
250	193	202	37	57
Average	161	183	42	72

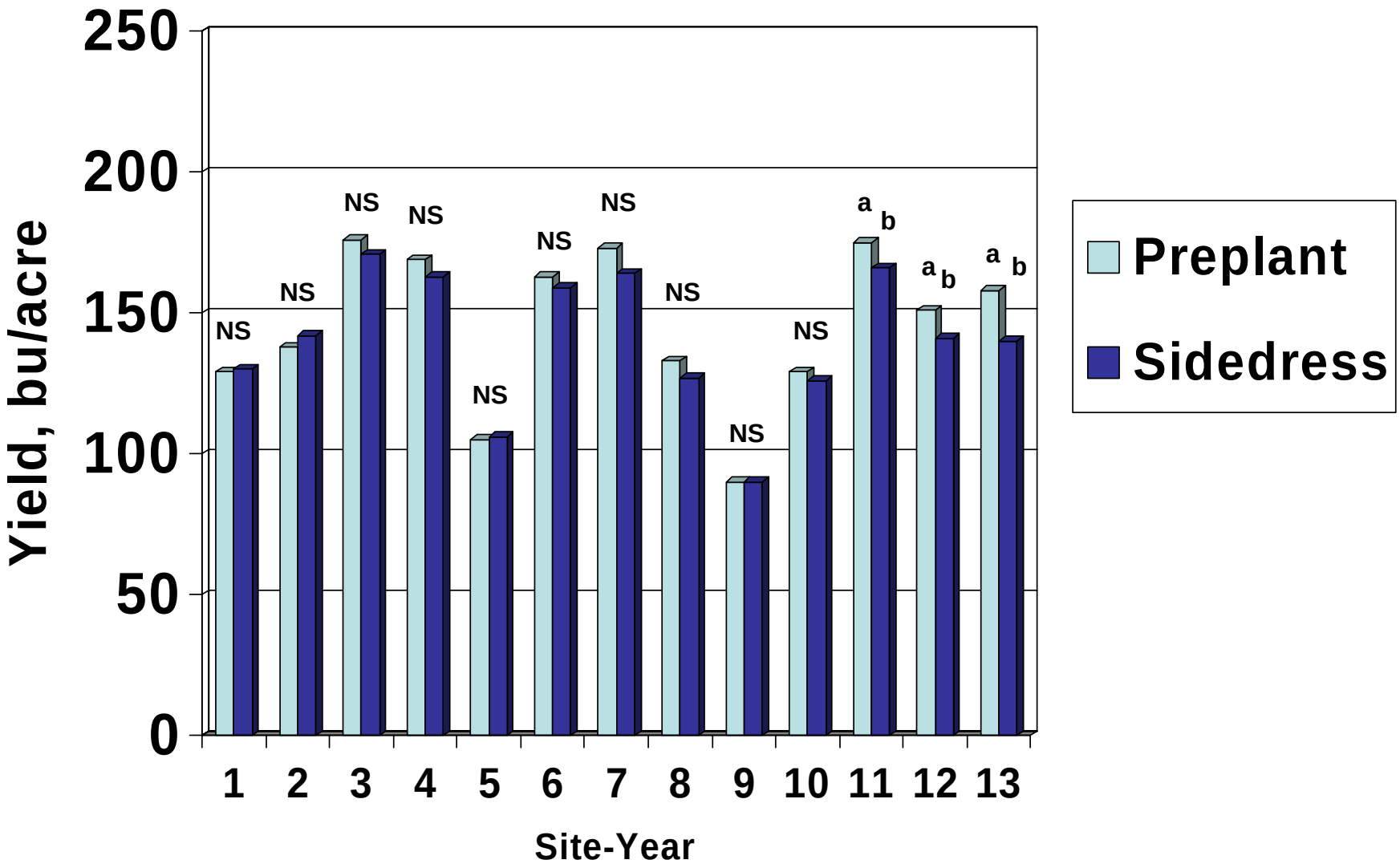
* Split sidedress N applied at 4 and 7 wk after planting.

Corn response to N timing in Iowa, Minnesota, and Wisconsin (1987-1992)

	Location (years)		
Sites	Iowa (1987-1991)	Minnesota (1989-1992)	Wisconsin (1988-1992)
Total	65	32	39
Responsive	25	28	20
PP = SD/Splt.	15	16	17
PP > SD/Splt.	8	4	3
PP < SD/Splt.	2	8	0

Killorn, IA; Randall, MN; Bundy, WI.

Corn yield response to preplant and sidedress N on silt loam soils in Wisconsin, 1990-1992



Recent experiments with N timing (Hanson et al., 2002)

- Medium and fine-textured soils
- Optimum sidedress N rates for corn after soybean were substantially lower than recommended rates (120 lb N/a)
- Yields in 12 experiments were near maximum with 50 lb N/acre sidedressed

Corn yield response to preplant and sidedress N in soybean-corn systems (Hanson et al., 2002)

Location*	N timing	N rate	Yield
		lb/acre	bu/acre
A	Sidedress	103	149
	Preplant	110	144
	Sidedress	143	151
C	Sidedress	90	166
	Preplant	90	167
	Sidedress	150	163

* Medium and fine-textured soils in S. Wisconsin

Corn yield response to preplant and sidedress N in a corn-corn system (Hanson et al., 2002)*

N timing	N rate	Yield
	lb/acre	bu/acre
Sidedress	135	130
Preplant	160	135
Sidedress	176	134

* Medium and fine-textured soils in S. Wisconsin

Corn yield response to preplant N rates in a soybean-corn system. Arlington WI, 2005.

N rate (lb/acre)	Yield (bu/acre)
0	163b
30	187a
60	191a
90	193a
120	195a
150	199a
180	198a
210	196a

EONR=54 lb N/acre. Data from J. Osterhaus, UW-Soil Science

Nitrogen rate and timing effects on corn yield, Columbia Co., 2005*

	N timing		
N rate	At planting	Split	Sidedress
lb /acre	---------- Yield, bu/acre ----------		
80	214	210	204
120	208	207	198
160	200	194	204
200	207	203	203

* Unreplicated on-farm trial. Data from L. Paine, Columbia Co. Extension. Planted 4/23; Sidedress 6/13/05.

SUMMARY

- Sidedress N applications usually are not superior to preplant on medium- and fine-textured soils
- Low optimum N rates on these soils are probably due to soil N availability rather than N timing.
- Sidedress N timing is essential on sandy soils.

Recommended Timing of Nitrogen Applications for Corn

Soil	Fall	Preplant	Sidedress
Medium/Fine Texture Well-Drained	OK*	Optimum	OK
Medium/Fine Texture Poorly Drained	No	OK	Optimum
Coarse texture	No	No	Optimum

*Includes use of BMPs for fall-applied N.

Corn yield response to preplant or split N at 32 sites in Minnesota, 1989-1992

Sites	No.	Soil parent material		
		Glacial till	Loess	Outwash
Total	32	14	11	7
N responsive	28	14	9	5
Preplt. = Split	16	7	7	2
Preplt. > Split	4	3	1	0
Preplt. < Split	8	4	1	3

Randall, MN