
Effect of Tillage on Alfalfa N Credit to Winter Wheat

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N Credit Questions with Wheat

- 1. Amount of N available to wheat?
- 2. Timing of release relative to wheat need?
- 3. Tillage effects?
- 4. Too much N?

Experimental variables:

- Tillage

No-till or moldboard plow

- Fall N rate

0 or 30 lb N/a

- Spring N rate

0, 20, 40 or 60 lb N/a

(Fall + spring N = 0, 20, 30, 40, 50, 60, 70 or 90 lb N/a)

Site characteristics and experimental details:

Location	Arlington 97-98	Arlington 98-99	Lancaster 98-99
<u>Soil</u>	Plano sil	Plano sil	Fayette sil

Alfalfa condition

• Stand age/stand density (plants/ft ²)	1.6	2.7	1.9
• Amount of regrowth (inches)	8	7	14
• Alfalfa kill date	24 Sept 97	20 Aug 98	4 Sept 98

Wheat management details:

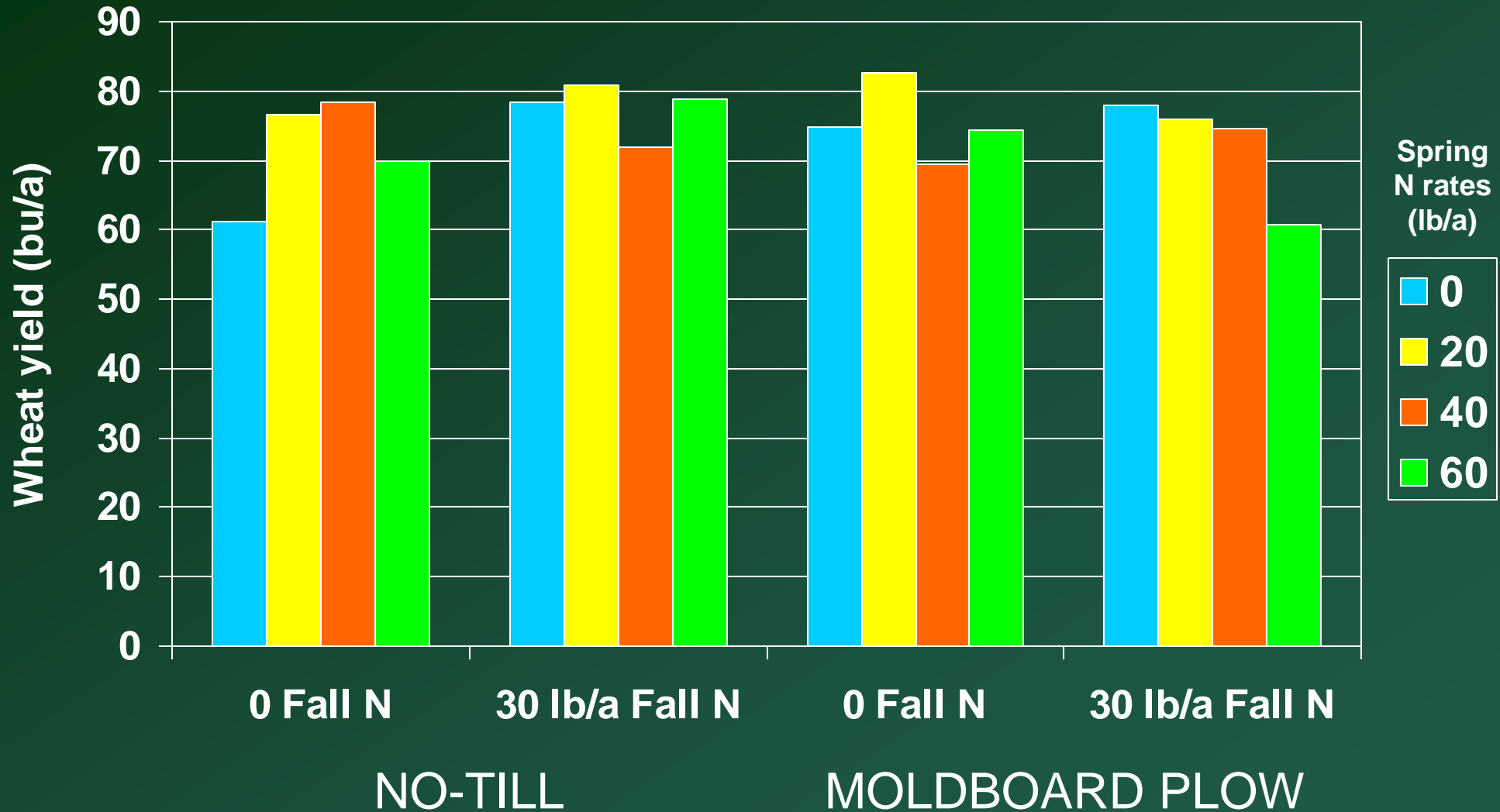
	Arlington 97-98	Arlington 98-99	Lancaster 98-99
• Variety	Glacier	Dynasty	Pioneer 25R26
• Plant date	3 Oct 97	21 Sept 98	17 Sept 98
• Fall N application	17 Oct 97	7 Oct 98	17 Sept 98
• Spring N application	28 Apr 98	31 Mar 99	7 Apr 99
• Harvest date	29 July 98	15 July 99	14 July 99

Significant* probability values for tillage wheat experiment:

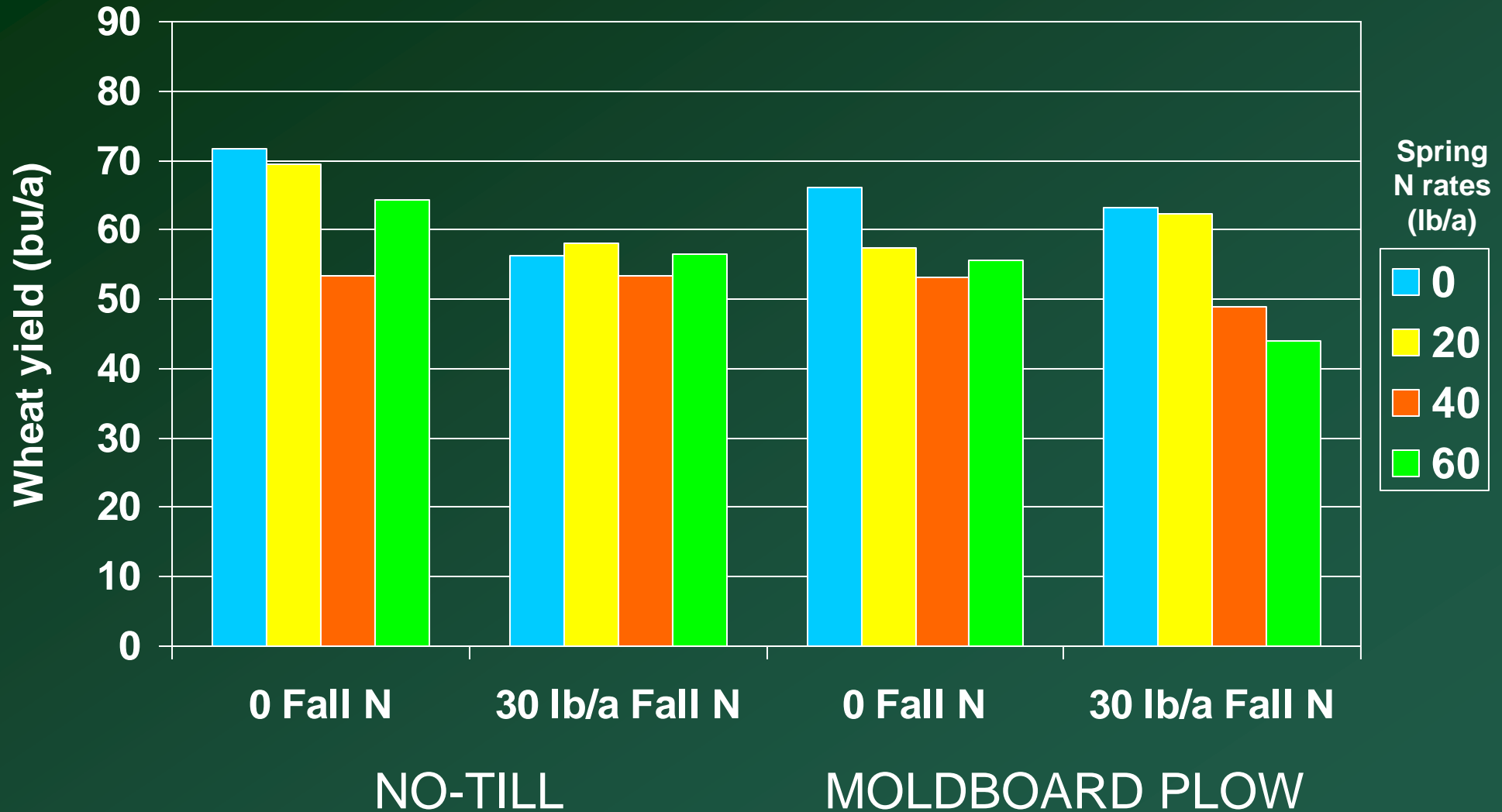
Arl 97-98		Arl 98-99		Lan 98-99	
Grain yld	Lodging	Grain yld	Lodging	Grain yld	Lodging
Sp N	T	T	T	T	T
T x FN	FN	FN	SN	FN	FN
T x SN	SN	SN	T x SN	SN	SN
FN x SN					
TxFNxSN					

*pr \geq 0.10

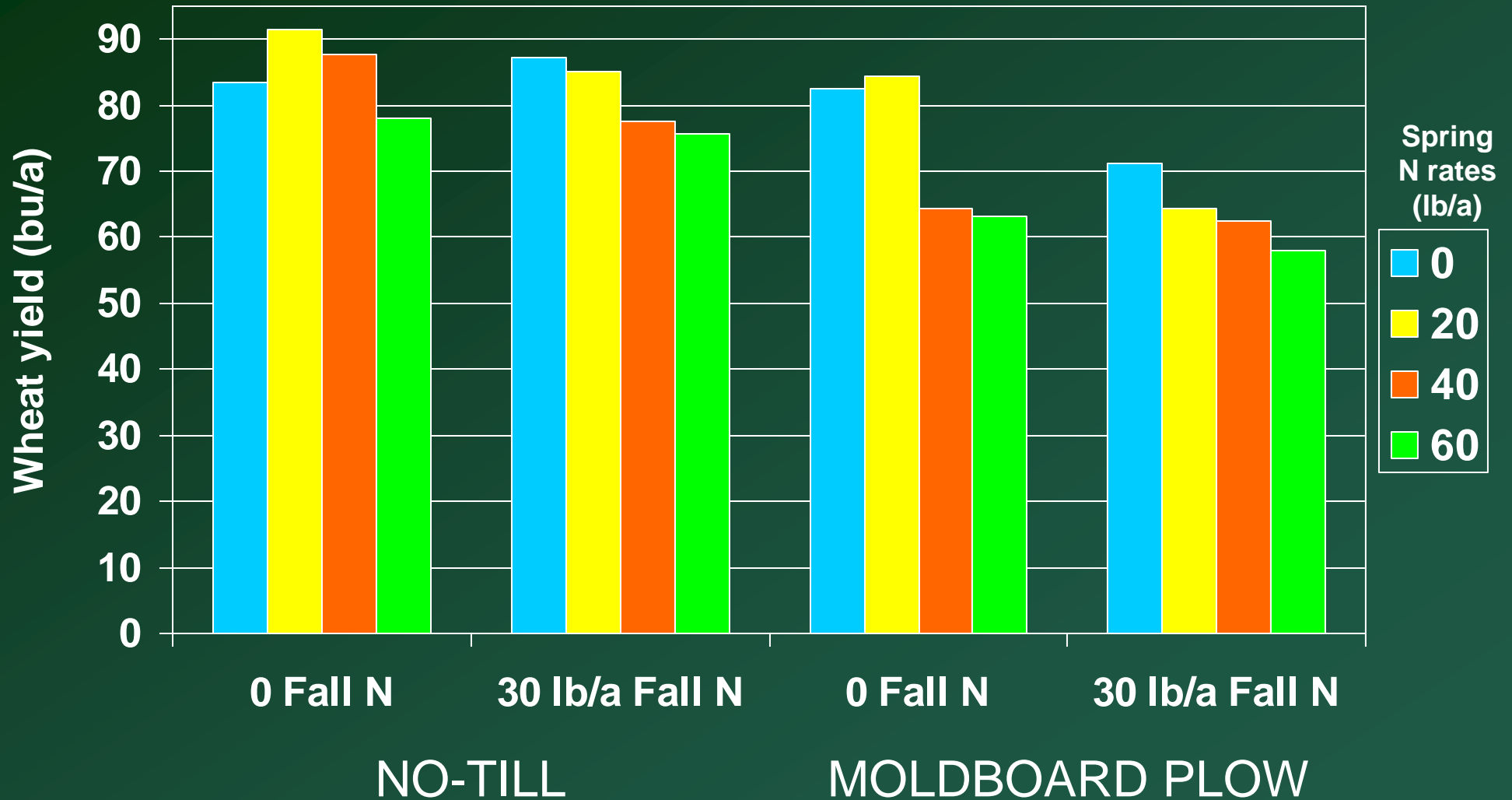
Yield response of wheat following alfalfa as affected by tillage and fall and spring N rates at Arlington, 1998



Yield response of wheat following alfalfa as affected by tillage and fall and spring N rates at Arlington, 1999



Yield response of wheat following alfalfa as affected by tillage and fall and spring N rates at Lancaster, 1999



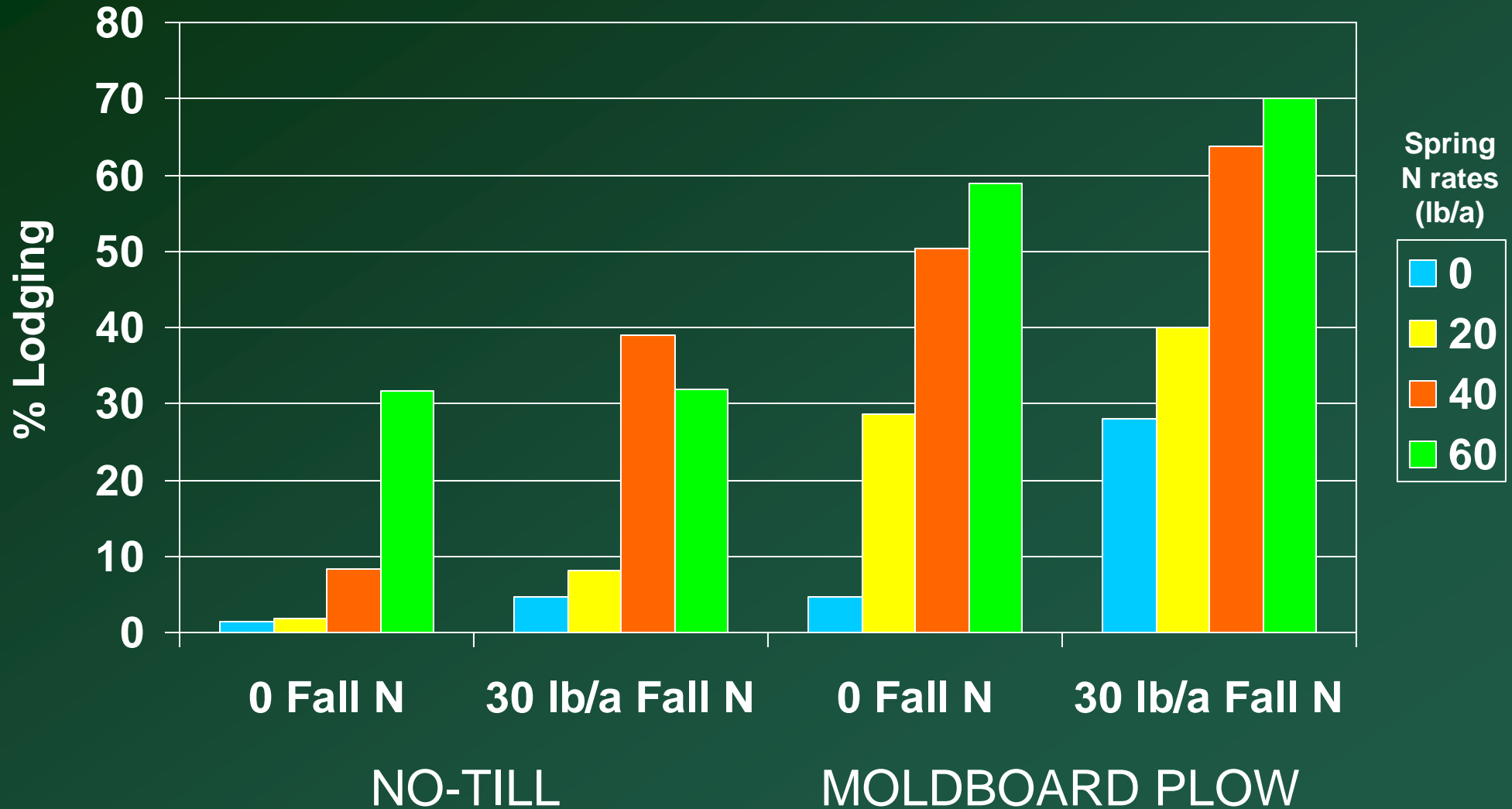
Autumn temperature deviations for alfalfa wheat experiment:

Month	Arl 97-98	Arl 98-99	Lan 98-99
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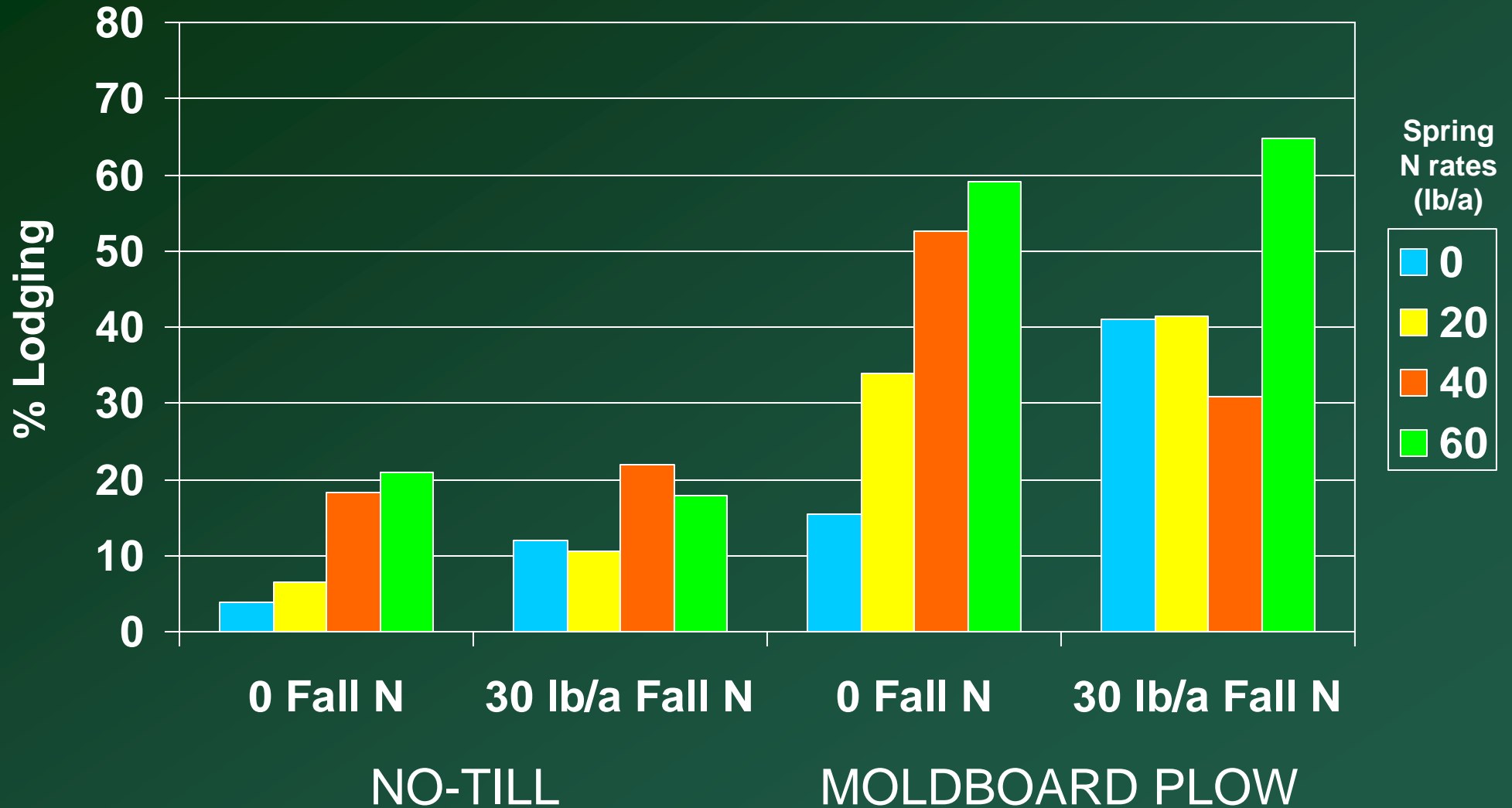
-----Deviation from 30 yr avg-----

Sep	+ 0.5	+ 4.6	+ 3.7
Oct	- 0.3	+ 1.2	+ 0.1
Nov	- 3.4	+ 3.8	+ 3.6
Dec	+ 6.0	+ 9.2	+ 7.5

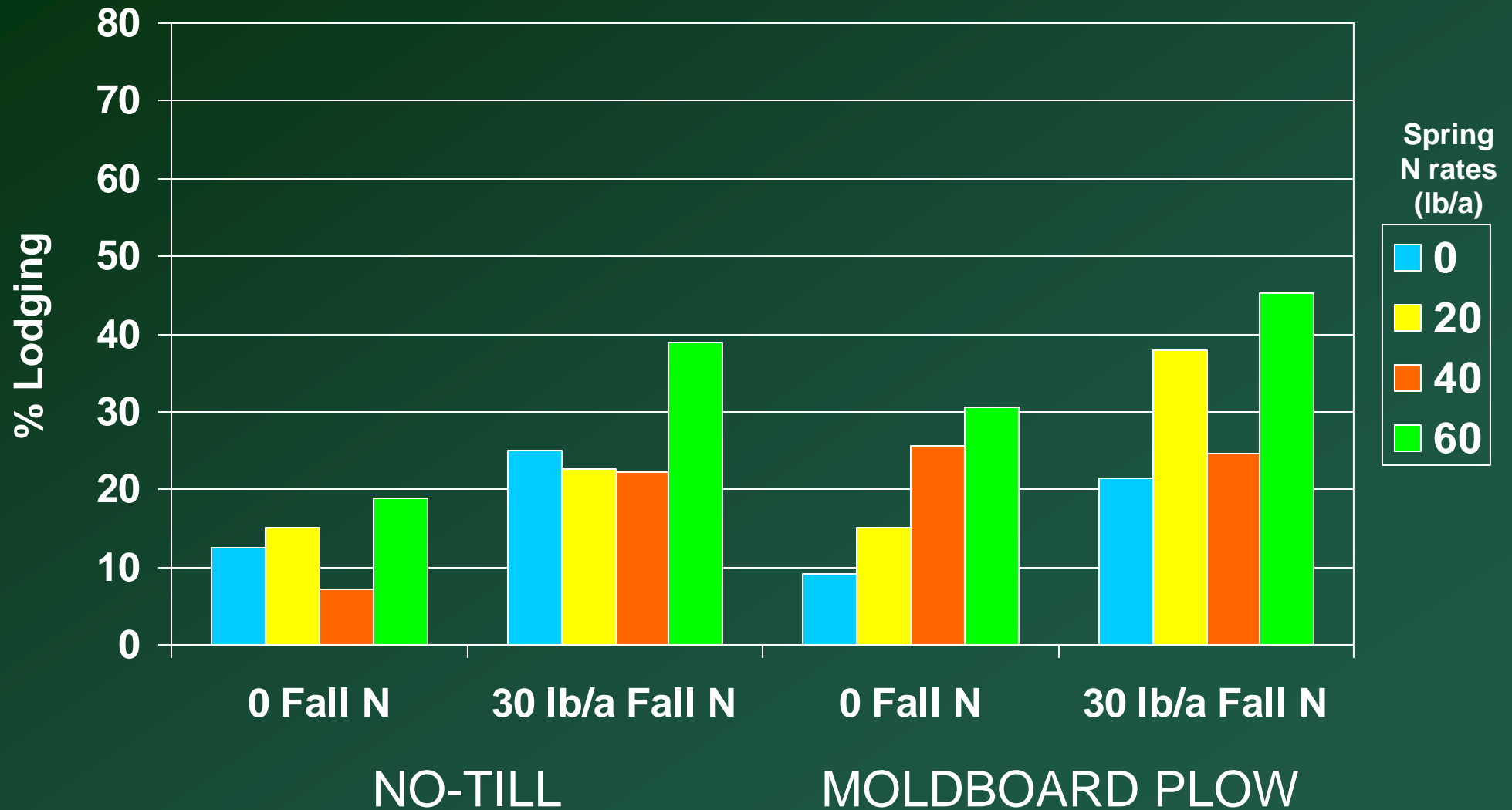
Lodging response of wheat following alfalfa as affected by tillage and fall and spring N rates at Arlington, 1998



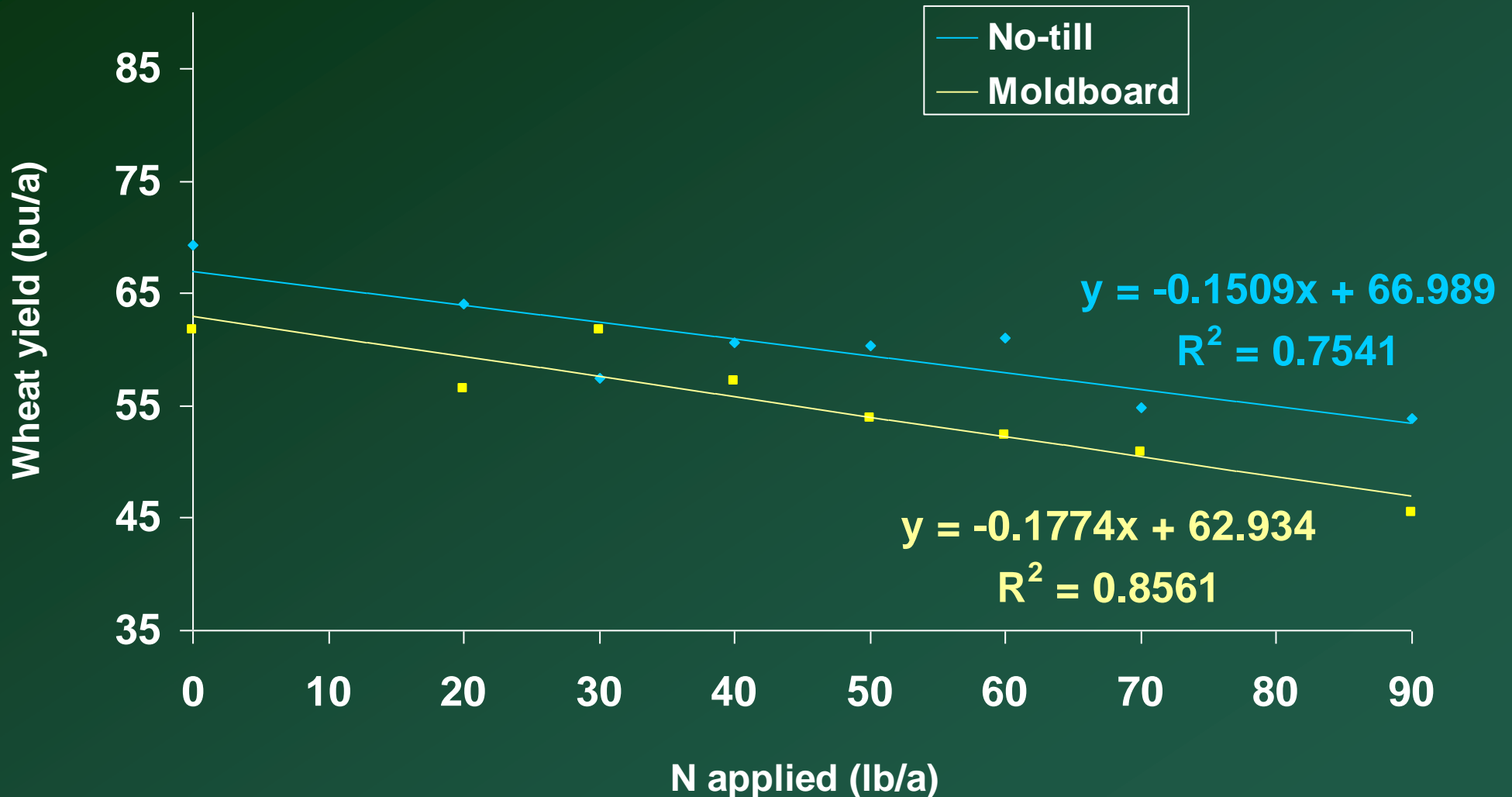
Lodging response of wheat following alfalfa as affected by tillage and fall and spring N rates at Arlington, 1999



Lodging response of wheat following alfalfa as affected by tillage and fall and spring N rates at Lancaster, 1999



Wheat yield vs. N applied for Arlington, 1999



Other results:

- Plowing increased available N by about 40 lb/a
- No difference between fall versus spring applied N
- N credit to corn for this stand = 120 lb N/a; for wheat only about 60 lb N/a

Summary:

1. No response to N for wheat following alfalfa when plowed
2. When no-tilled response to only about 20 lb N/a (2 of 3 years)
3. Lodging increased linearly with N rate applied
4. Fair stand with 6-8 inches of regrowth supplied about 60 lb N to wheat
5. Plowing increases N credit about 40 lb N/a