Plant and Soil Sciences Extension

Overcoming the Obstacles of Producing Winter Canola in No-till Production Systems in the Southern Great Plains

Chad Godsey and Randy Taylor

Canola Conferences

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Introduction

- Loss of stand in no-till following winter wheat
  - Non winter hardy varieties/hybrids
- Not spreading residue at wheat harvest
- Shallow seeding depth

Methods

- RCBD with 4 replications; 3 site years
  - Plots 3.5 m by 11 m
- Treatments in these experiments included light disking (*Conventional*), no-till (*No-Till*), no-till with residue removed (*NT-No Residue*), no-till with twice as much residue (*NT-2X Residue*), and no-till with residue burned at planting (*NT-Burn*).
- Emergence counts taken every other day for 14 d after planting
- Soil temperatures and winter stand loss were measured.

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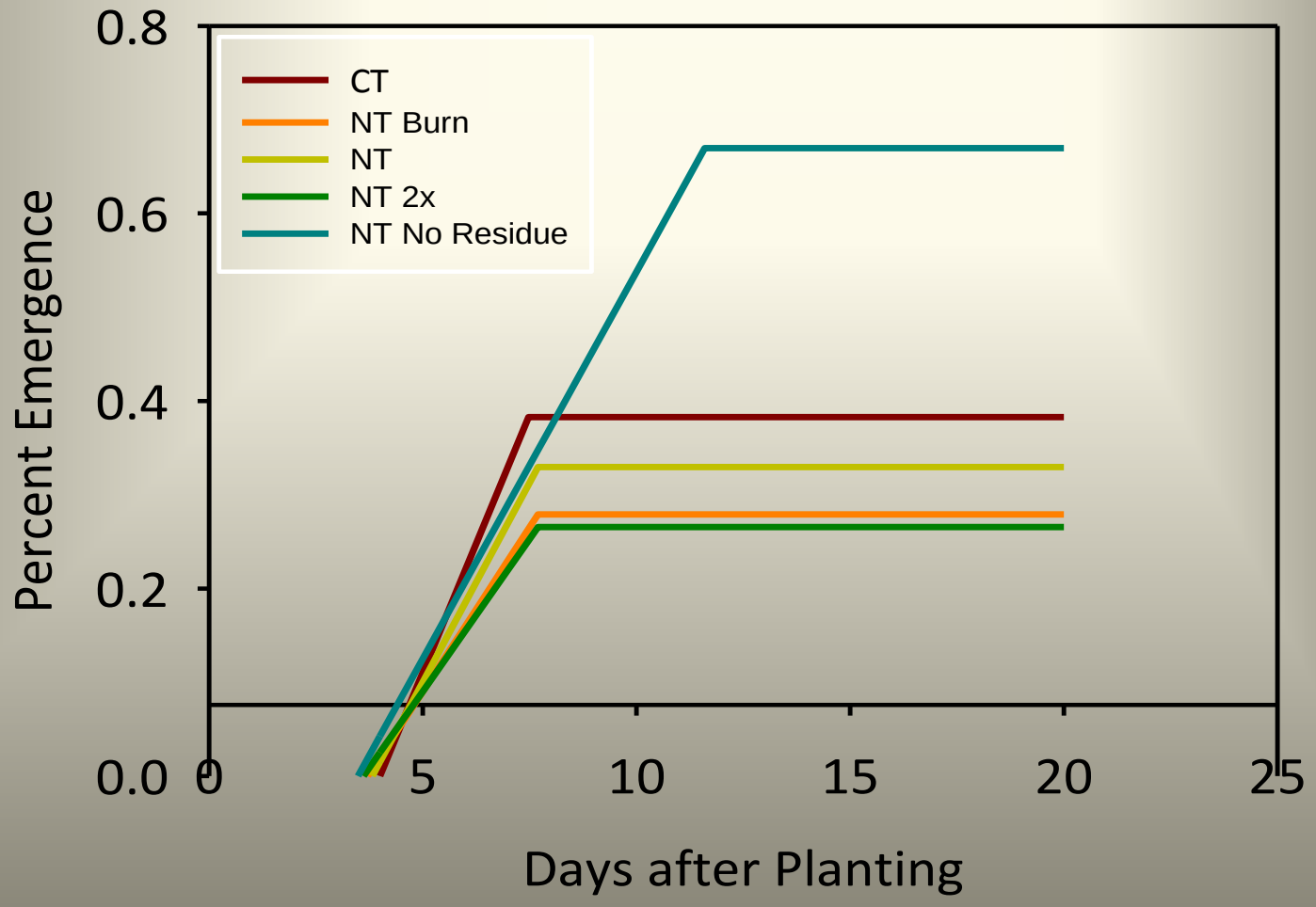
Emergence at Site A in 2008



Final fall stands and winter survival for Noble County, Oklahoma locations.

	Site A			Site B		
Treatments	Final Fall Stands	Winter Survival	Decrease	Final Fall Stands	Winter Survival	Decrease
	- - - plants/ft^2 - - -		- - - % - - -	- - - plants/ft^2 - - -		- - - % - - -
Conventional Till	1.7bc	1.7b	0.0a	4.9b	4.1b	0.17a
NT Burn	1.5c	1.2b	0.2a	3.4b	2.8bc	0.17a
NT	1.0a	0.8b	0.2a	3.5b	2.6bc	0.24a
NT - 2x Residue	2.6bc	1.4b	0.5a	2.7b	0.9c	0.67b
NT No Residue	4.2a	3.9a	0.1a	8.8a	6.3a	0.28a

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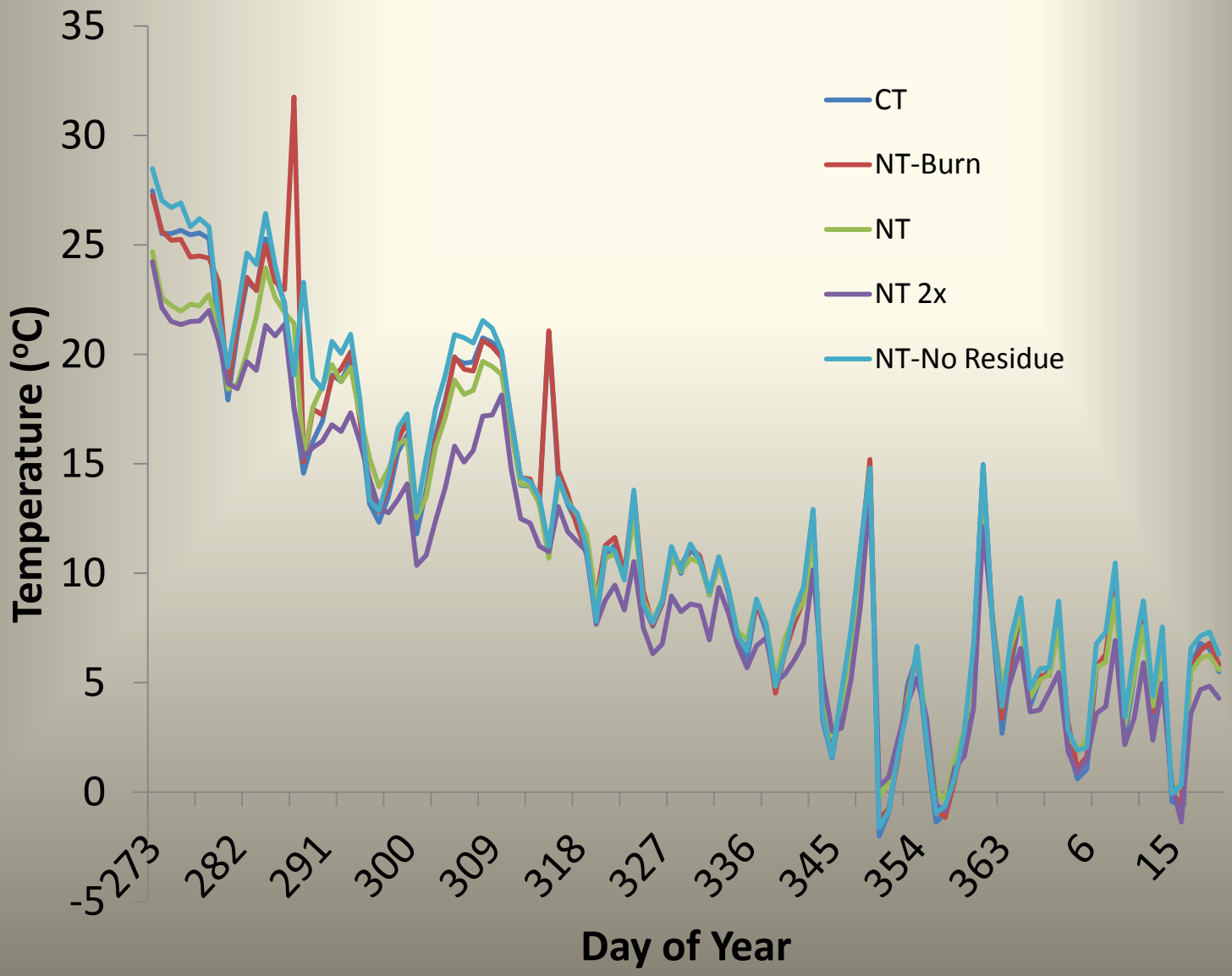
Final fall canola stands and winter survival for Perry, OK location.

Treatments	Final Fall Stands	Winter Survival	Decrease
	- - - plants/ft^2 - - -		- - - % - - -
Conventional Till	6.7a	5.7a	0.15
NT Burn	7.8a	6.5a	0.17
NT	7.5a	6.3a	0.16
NT - 2x Residue	5.3b	3.0b	0.43
NT No Residue	7.2a	7.0a	0.03

Soil Temperature – 2.5 cm



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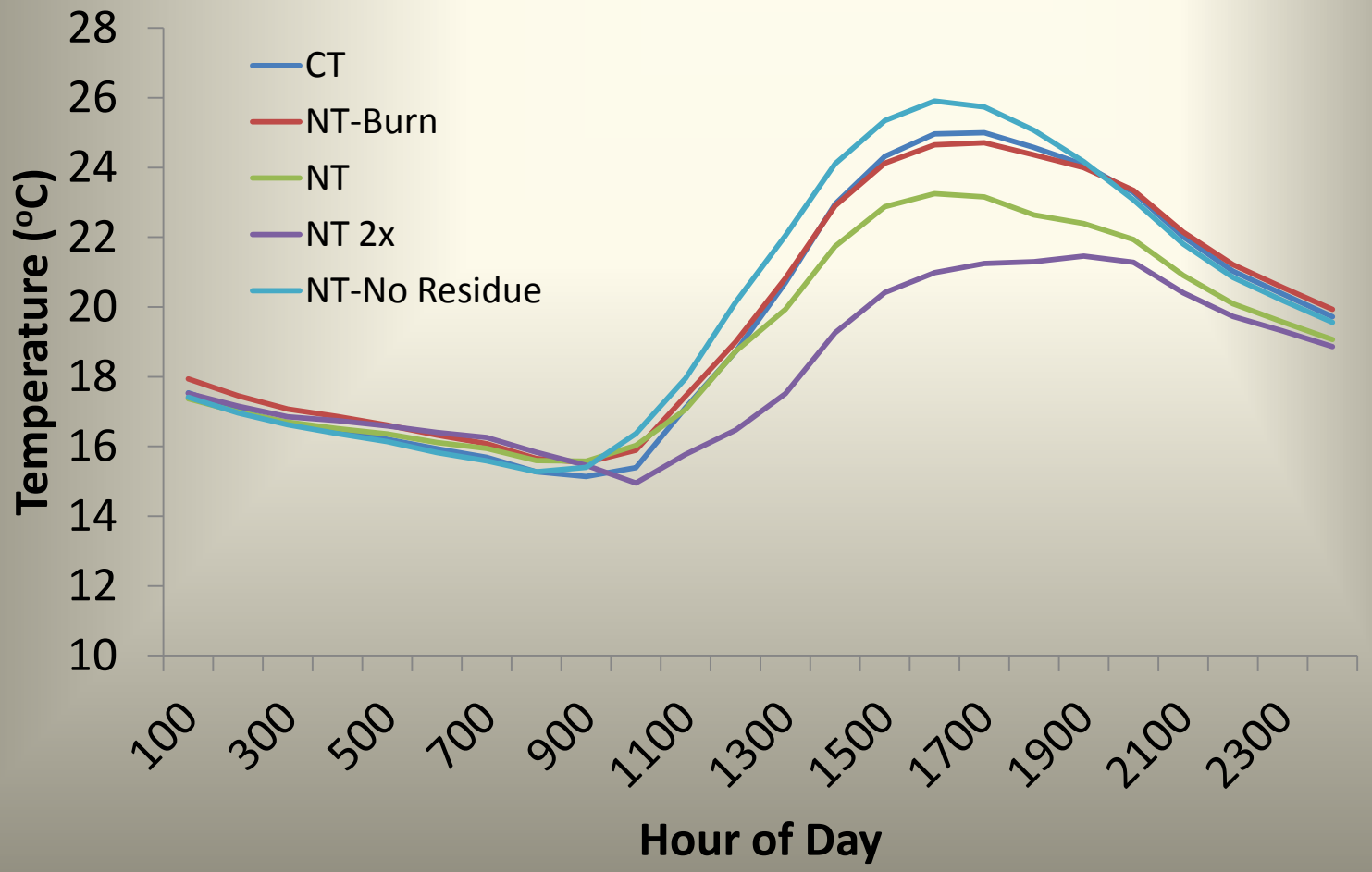
Soil Temperature on DOY 284 – 2.5 cm



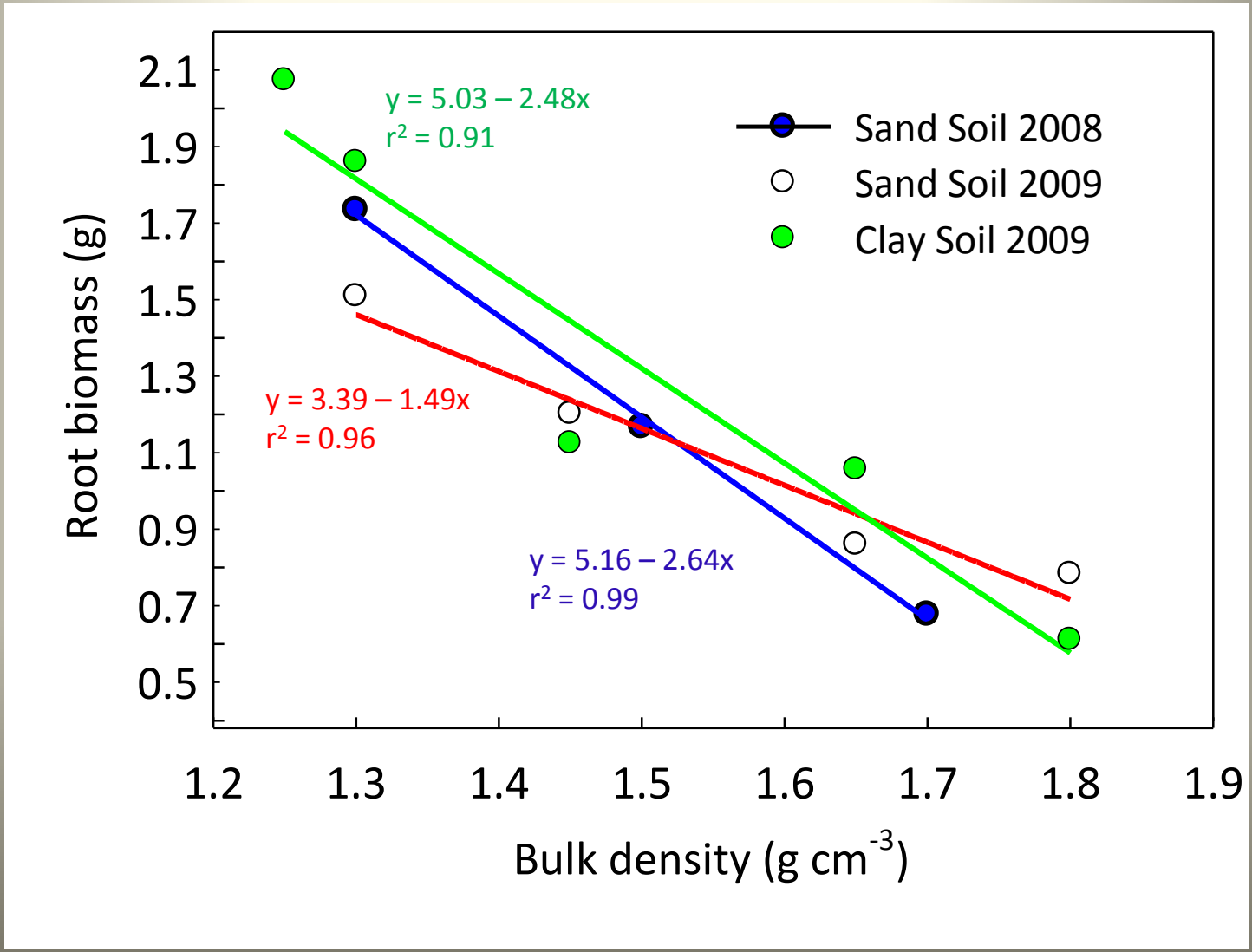
Winter canola grain yields at Noble County, Oklahoma locations in 2008.

	Yield	
Treatment	Site A	Site B
	- - kg ha^{-1} - -	
Conventional Till	2150 a	616 a
NT Burn	2201 a	619 a
NT	2196 a	849 a
NT - 2x Residue	1752 b	317 b
NT No Residue	2243 a	683 a

Summary of Field Studies

- We feel like we can overcome the obstacles of no-till winter canola production by paying attention to the details.
  - Planting date, residue management, and cultivar selection
- Complex issue that goes beyond the field study.

Greenhouse Study – Bulk density vs. root biomass



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Top photo is shows increasing bulk density from left to right. Bottom left photo is showing root growth at 1.3 g cm^{-3}, middle photo is 1.5 g cm^{-3}, and the right photo is root growth at 1.7 g cm^{-3}.

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Evaluating 30” Row Canola

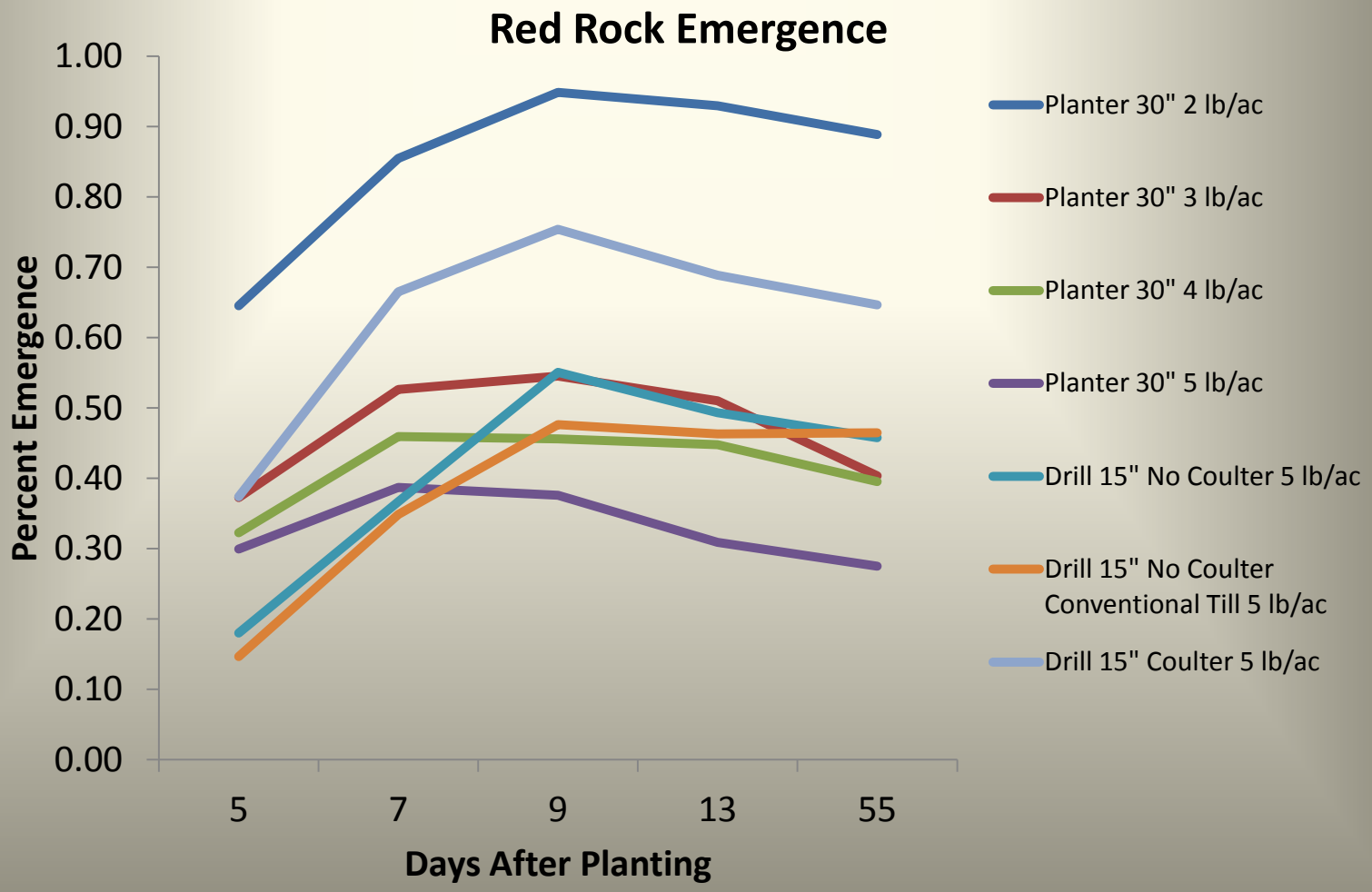

Table 3. Final fall stands and winter survival for Red Rock, OK location.							
Trt No.	Seeder	Spacing	Residue Management	Tillage	Final Fall Stands	Winter Survival	Decrease
					- - plants/ft^2 - -		- - % - -
1	Planter	30	Yes	no till	4.6	3.1	**33%**
2	Planter	30	Yes	no till	12.3	2.4	**80%**
3	Planter	30	Yes	no till	16.4	3.0	**82%**
4	Planter	30	Yes	no till	14.1	2.5	**82%**
5	Drill	15	No	no till	6.0	4.5	**26%**
6	Drill	15	No	CT	6.1	5.2	**15%**
7	Drill	15	Coulter	no till	8.5	5.9	**31%**

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Modifying Sorghum Disks

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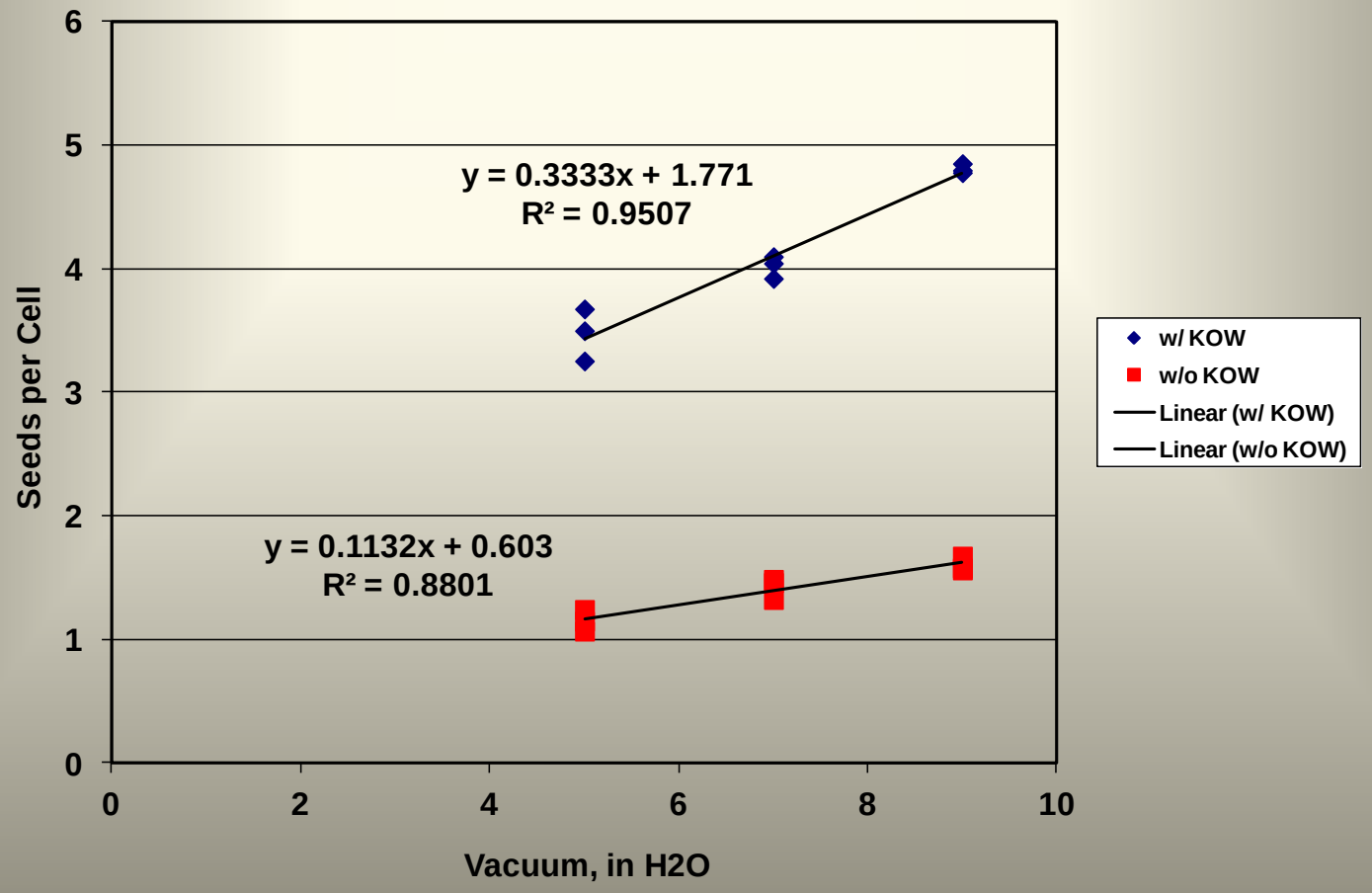
Vacuum Level



Summary

- Seeding depth
- Residue distribution
- Plant a winter canola cultivar that has excellent winter hardiness and low crown development.
- Burning immediately prior to seeding will increase winter survival.

Summary

- Increase your seeding rate by 15 – 20% for drilled.
- Remove as much residue from the seed row as possible.
- Pay careful attention to planting date and plant early in the “planting window” for your region.
- Avoid seeding winter canola into young no-till fields. Older fields (less than three years) will have better soil structure and lower bulk densities that will promote root growth.

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Thank You

Chad Godsey
Tel: 405-744-3389
Email: chad.godsey@okstate.edu

Randy Taylor
Tel: 405-744-5277
Email: randy.taylor@okstate.edu