

Tillage : Can it be a Tool for Slug Management in No-till Field Corn ?



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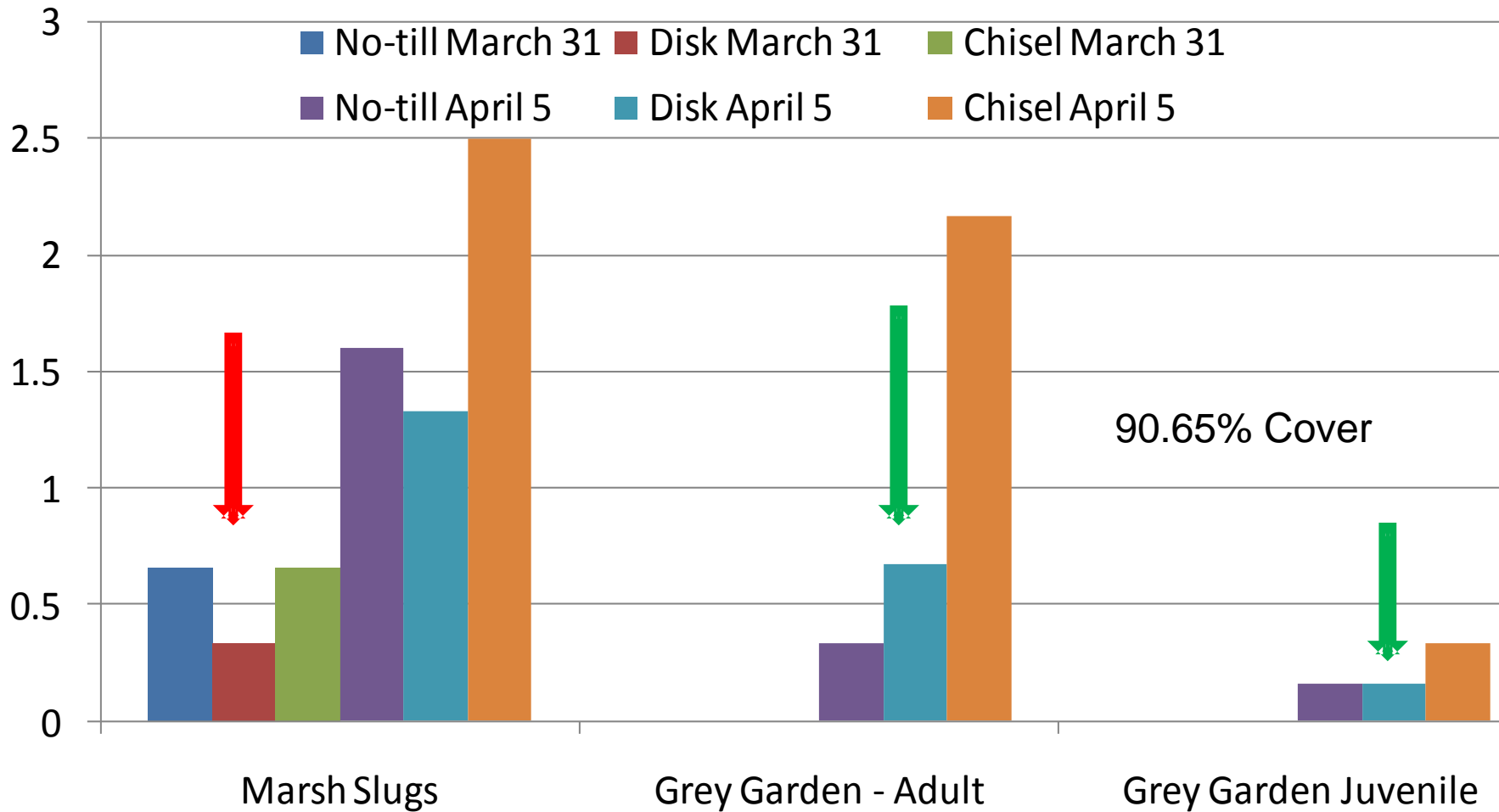
Methods: Tillage Implements



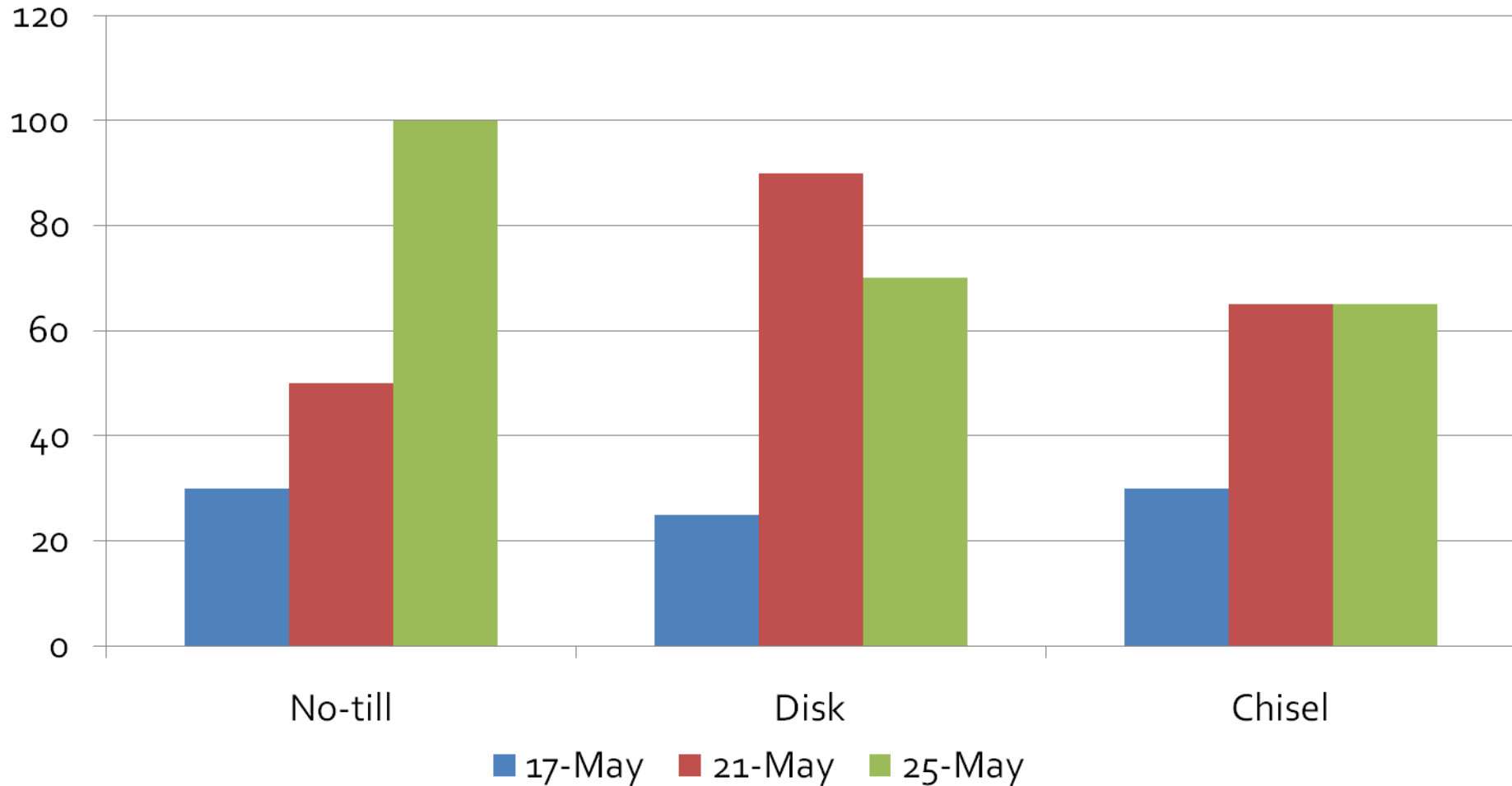
Photos: J. McGrath – Un of MD

2010 Tillage Demonstrations

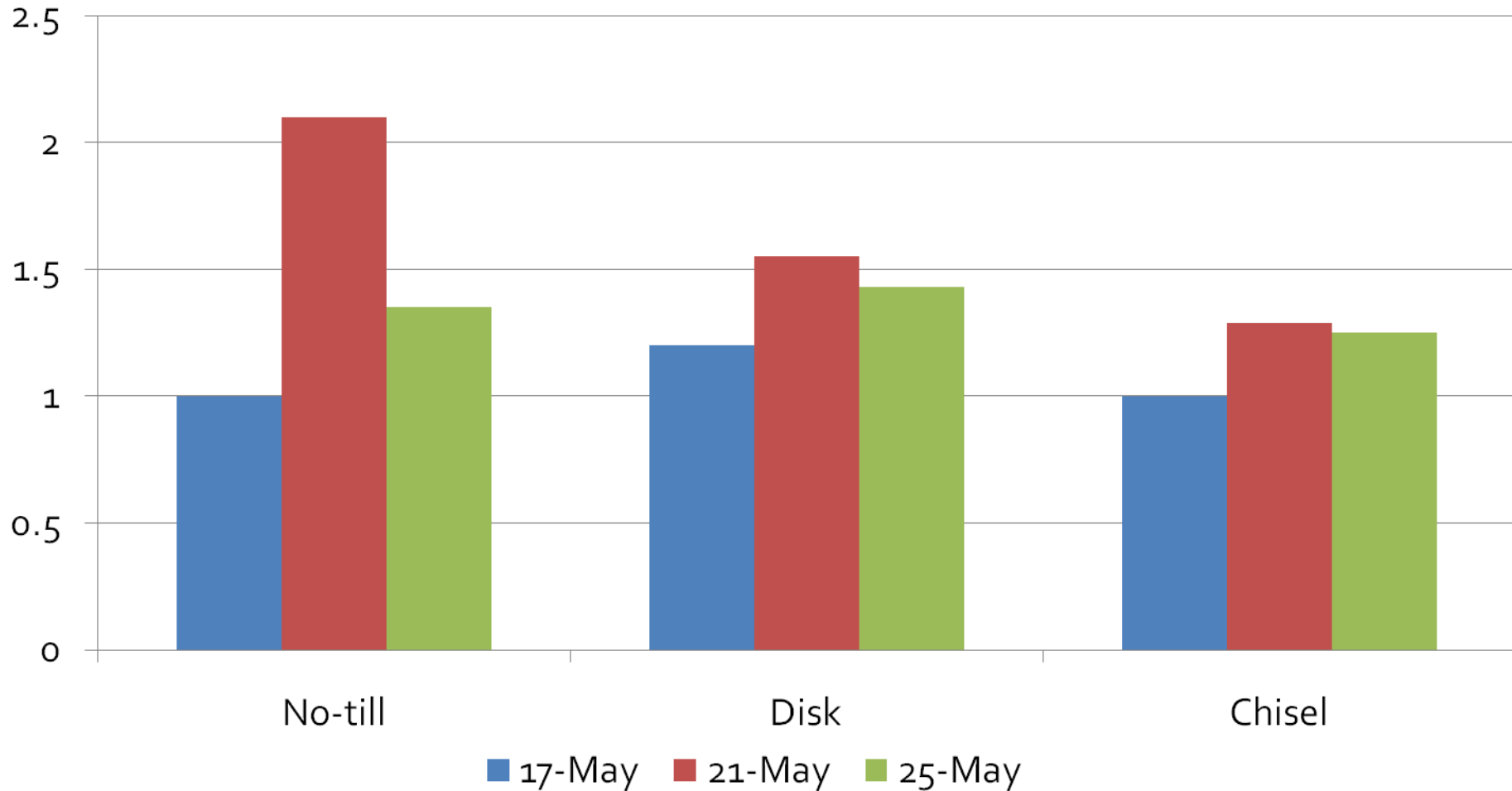
Field #1 – Pre-Plant



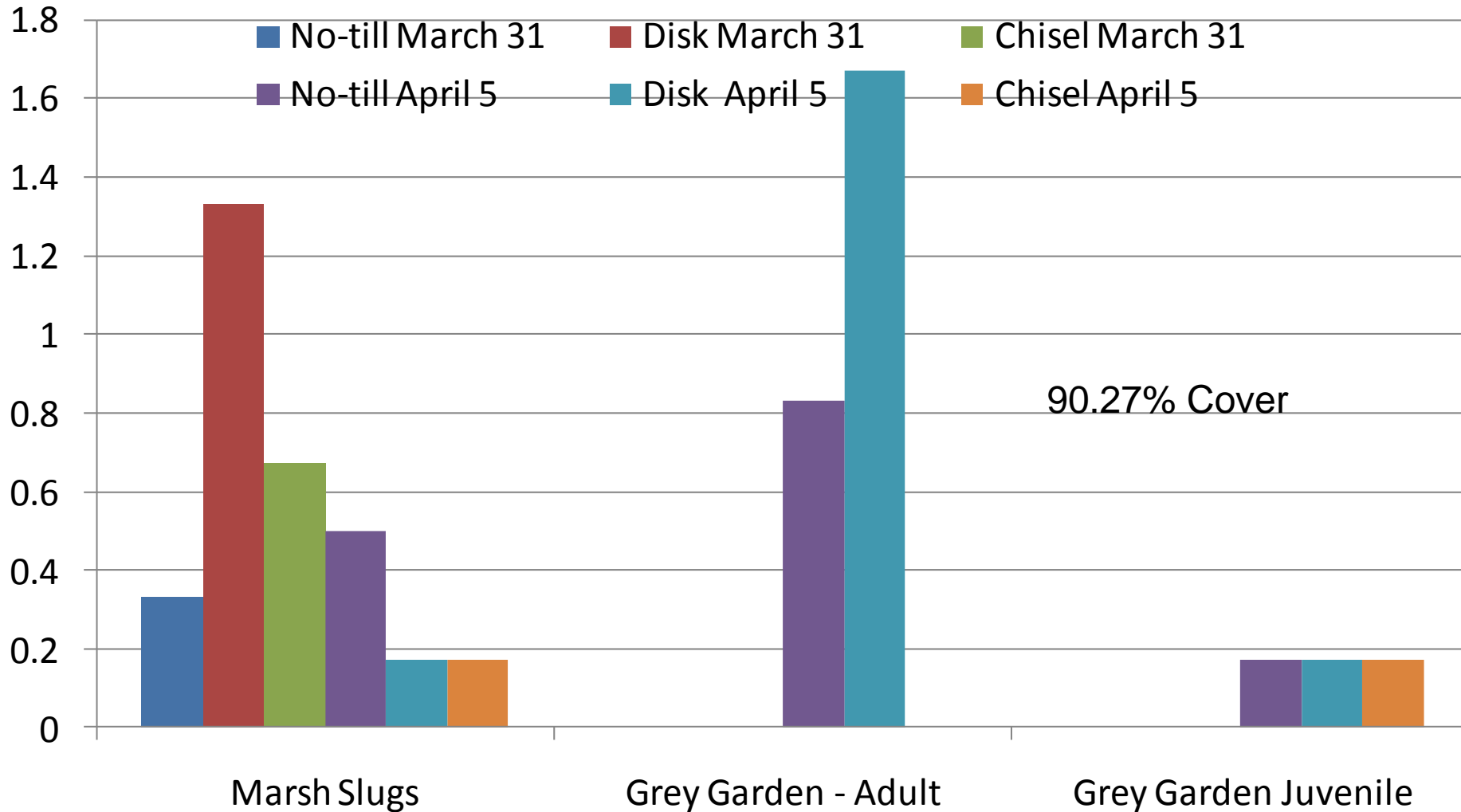
Field #1 : Post Plant Percent Damaged Plants



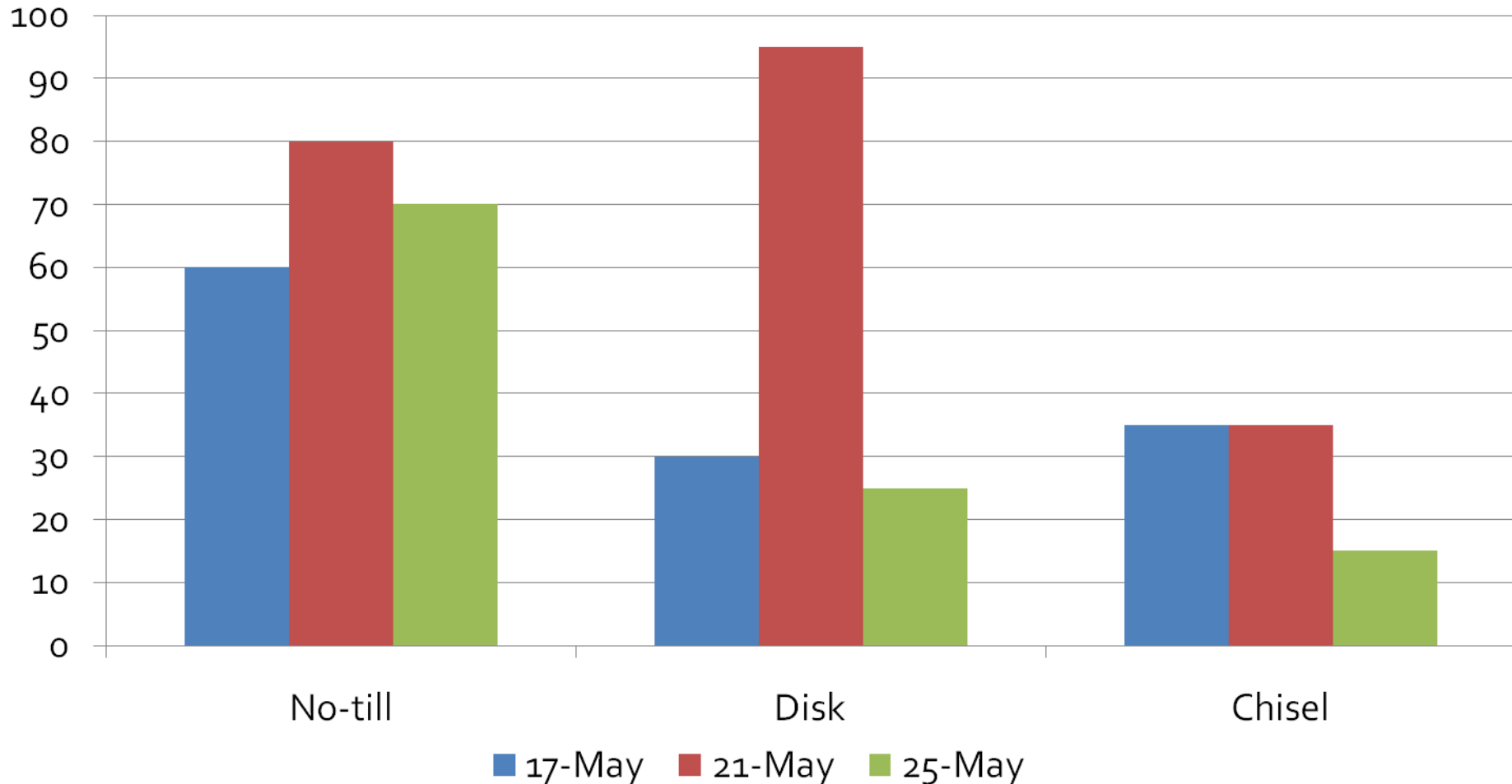
NCC Field #1 : Post Plant Damage Rating



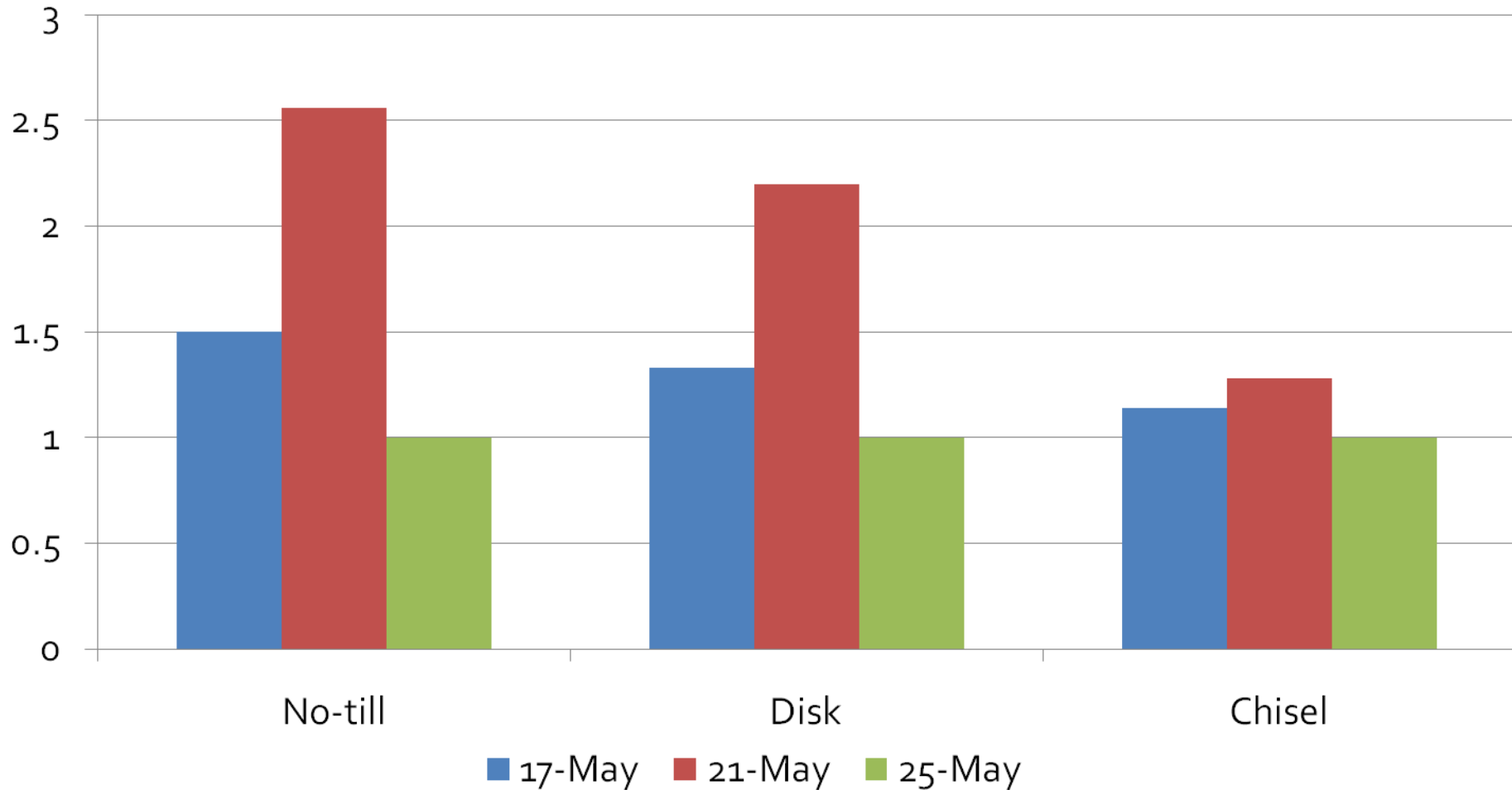
Field #2 – Pre-Plant



Field #2 : Post Plant Percent Damaged Plants



Field #2 : Post Plant Damage Rating





Vertical tillage:
Great plains
turbo-till: 2 – 3”
depth

Vertical Tillage

Chisel - Disc



Vertical Tillage



No-till

Vertical Tillage

Turbo Till – Grower Fields

Location #	Pre-Count Av per sq ft April 5	% Damage May 25	Rating May 25
1 (TT)	11	14	1
2 (TT)	9	1.25	1
3 (NT)	7 (5)	76(2)	2.5 (1)

Objectives in 2011

- Identify and document the conditions associated with vertical tillage that could help reduce slug populations and/or the damage caused by slugs in no-till corn systems
- Document the impact of vertical tillage on overall soil health in no-till corn systems
- Identify potential water quality benefits of using vertical tillage in no-till corn systems and start to develop a process to document the impact

Cooperators

- 3 producers in Kent County: 2 with historical slug problems – started with 9 fields pre-planting; ended with 4 fields with paired strips
- Willard Agri-Service: helped producers GPS strips so we can capture yield data
- NRCS : assistance with soil health evaluations

Before Strips Established

- Slug Sampling in 5 -10 locations per field
- Shingle Sampling : 1 ft² sampling units; placed between the previous year's crop rows and cleared residue from below each shingle; weekly counts on adults and juveniles
- Egg Surveys in 1 sq ft area next to shingles: used Ron Hammond's video

Strips Established and Fields Planted

- Slug Population Assessments

(a) shingles back in fields after corn was planted – 2 weeks approx.

(b) counted damaged plants per 10 ft – new damage

(c) Damage ratings - 0-4 rating scale

0= no damage; 1= only one leaf showing damage (less than 25% defoliation); 2= all leaves showing moderate damage (25-50% defoliation); 3= all leaves consumed except one remaining intact (greater than 75% defoliation); 4= completely removed at ground level.

(d) Shingles back in the fall after harvest - ??

- Plant populations – to see if slugs were reducing stand

Strips Established and Fields Planted

- Soil Health Measurements : percent cover, compaction with a penetrometer (8,16 and 24 inches), infiltration, bulk density for compaction, slake test for soil stability -- indicator of biological activity
- Pitfall Traps for Identification of Beneficial Species
- Yield Data –yield monitor ; hand harvested if needed ???

Grower # 1 (6 paired strips)

Pre-Planting

Slug Stage	Total Number Shingle Counts (5) March 29 - April 4	Total Number per Square Ft (10) April 11 - 20
Eggs	6	14
Marsh Slug – Adults	2	0
Marsh Slug - Juveniles	0	0
Grey Garden Slug Adults	4	2
Grey Garden Slug Juveniles	0	0

Grower # 1 (6 paired strips)

Post Planting

Date	Tillage Type	Average		
		Damage Rating	% Damaged Plants	Slugs/shingle
May 6	NT	----	7.6	0.2 GG
	TT	----	8.0	0.3 GG
May 16	NT	0.7	15.7	0.13
	TT	0.6	17.7	0
May 24	NT	0.3	7.0	1.8
	TT	0.3	6.0	1.2

Grower #1 – Soil Health

Measure	Value	NT	TT
Compact – 8"	psi	224	228
Compact - 16"	Psi	255	270
Compact-24"	psi	189	203
Infiltration	secs	643	188
Cover	%	77	54

Grower # 2 (3 paired strips) Pre-Planting

Slug Stage	Total Number Shingle Counts (5) March 21 - April 4
Eggs	13
Marsh Slug – Adults	3
Marsh Slug - Juveniles	0
Grey Garden Slug Adults	5
Grey Garden Slug Juveniles	0

Grower # 2 (3 paired strips) Post Planting

Date	Tillage Type	Average		
		Damage Rating	% Damaged Plants	Slugs/shingle
May 18	NT	0.5	12.7	0.5
	TT	0.5	10.6	0.13
June 3	NT	0.8	18.0	0.33
	TT	0.3	5.3	0

Grower #2 – Soil Health

Measure	Value	NT	TT
Compact – 8"	psi	276.7	227.8
Compact - 16"	Psi	328.9	267.8
Compact-24"	psi	210.0	190
Infiltration	secs	115.5	74.7
Cover	%	85	56

Grower # 3 A (3 paired strips)

Pre-Planting

	Total Number Shingle Counts (5) March 21 - April 4	Total Number per Square Ft (10) April 11 - 20
Eggs	16	18
Marsh Slug – Adults	2	0
Marsh Slug - Juveniles	0	2
Grey Garden Slug Adults	2	0
Grey Garden Slug Juveniles	0	13

Grower # 3A (3 paired strips)

Post Planting

Date	Tillage Type	Average		
		Damage Rating	% Damaged Plants	Slugs/shingle
May 9	NT	----	1.3	1.3 GG
	TT	----	0	0
May 16	NT	2.0	76	0.8
	TT	1.7	63	0
May 24	NT	1.4	68.7	0.3
	TT	1.3	60.7	0.2

Grower #3-A – Soil Health

Measure	Value	NT	TT
Compact – 8"	psi	184.7	208.7
Compact - 16"	Psi	201.3	210.3
Compact-24"	psi	164.7	172
Infiltration	secs	292.8	75.5
Cover	%	73	54

Grower # 3 B (3 paired strips) Pre-Planting

	Total Number Shingle Counts (5) March 21 - April 11	Total Number per Square Ft (10) April 11
Eggs (sq ft)	48	0
Marsh Slug – Adults	3	0
Marsh Slug - Juveniles	0	0
Grey Garden Slug Adults	5	7
Grey Garden Slug Juveniles	0	0

Grower # 3B (3 paired strips)

Post Planting

Date	Tillage Type	Average		
		Damage Rating	% Damaged Plants	Slugs/shingle
May 9	NT	1.5	67.3	1.8
	TT	1.4	44.7	0.2
May 16 *	NT	1.3	40.7	1.0
	TT	0.7	17.3	0.2
May 24	NT	0.7	33.3	0
	TT	1.1	46.7	0

Grower #3-B – Soil Health

Measure	Value	NT	TT
Compact – 8"	psi	206.7	202.7
Compact - 16"	Psi	235.3	221.3
Compact-24"	psi	198	178
Infiltration	secs	307.7	43.8
Cover	%	76	49

Summary

- Trend for Growers #2 and 3 – turbo till less plant damage – is it significant ?? – need true replication
- Soil Health:
 - compaction generally same in no-till and turbo tilled areas at least to 24"
 - infiltration faster in turbo tilled
 - Bulk Density: similar numbers in 2 locations (grower #2 and 3A)