

Advances in Precision Agriculture for Peanut Production

Simer Virk

Assistant Professor &
Extension Precision Ag Specialist
University of Georgia
X @PrecAgEngineer



Precision Ag Technology Applications



Fertilization

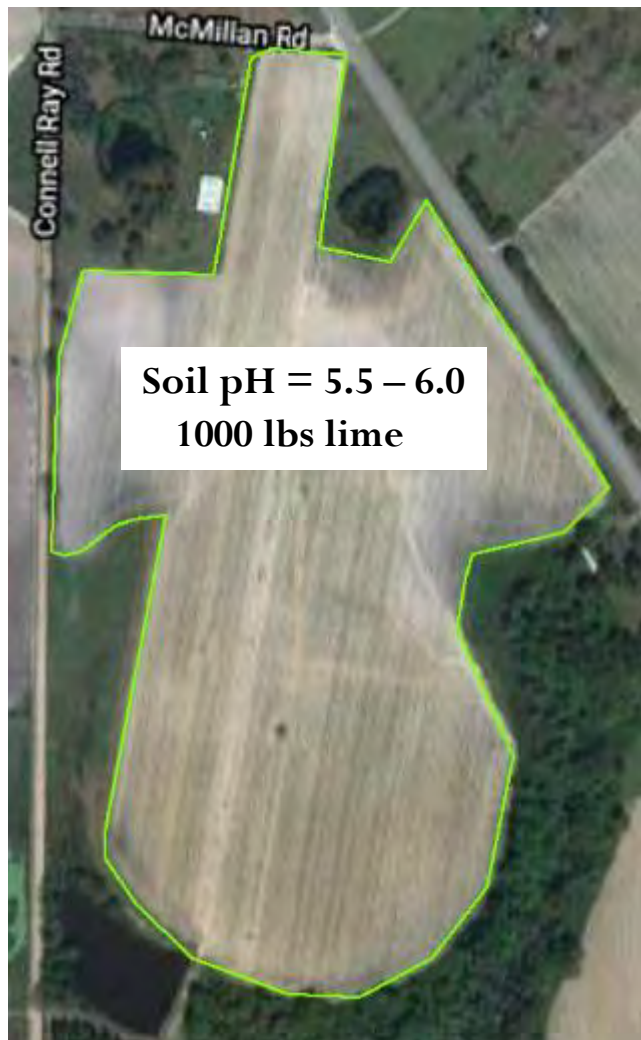


Planting

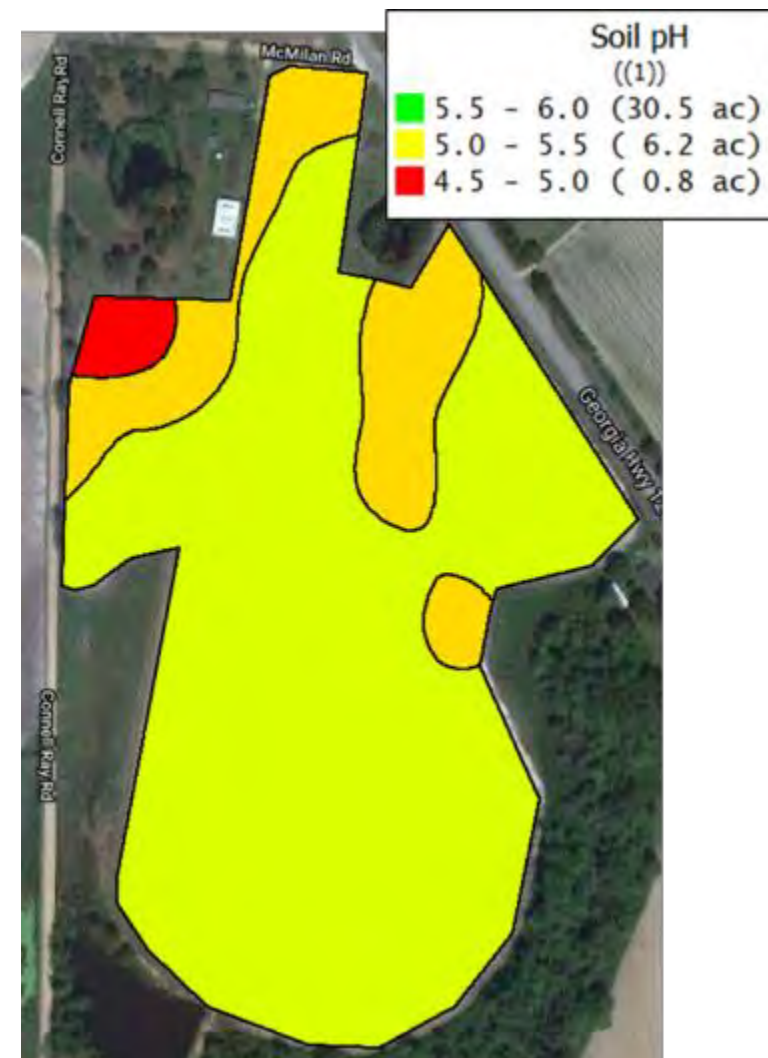


Pest Management

Precision Soil Sampling to Inform Accurate VR Lime Applications



Soil Sampled using 2.5-ac grids



Soil pH: 5.50 – 6.00

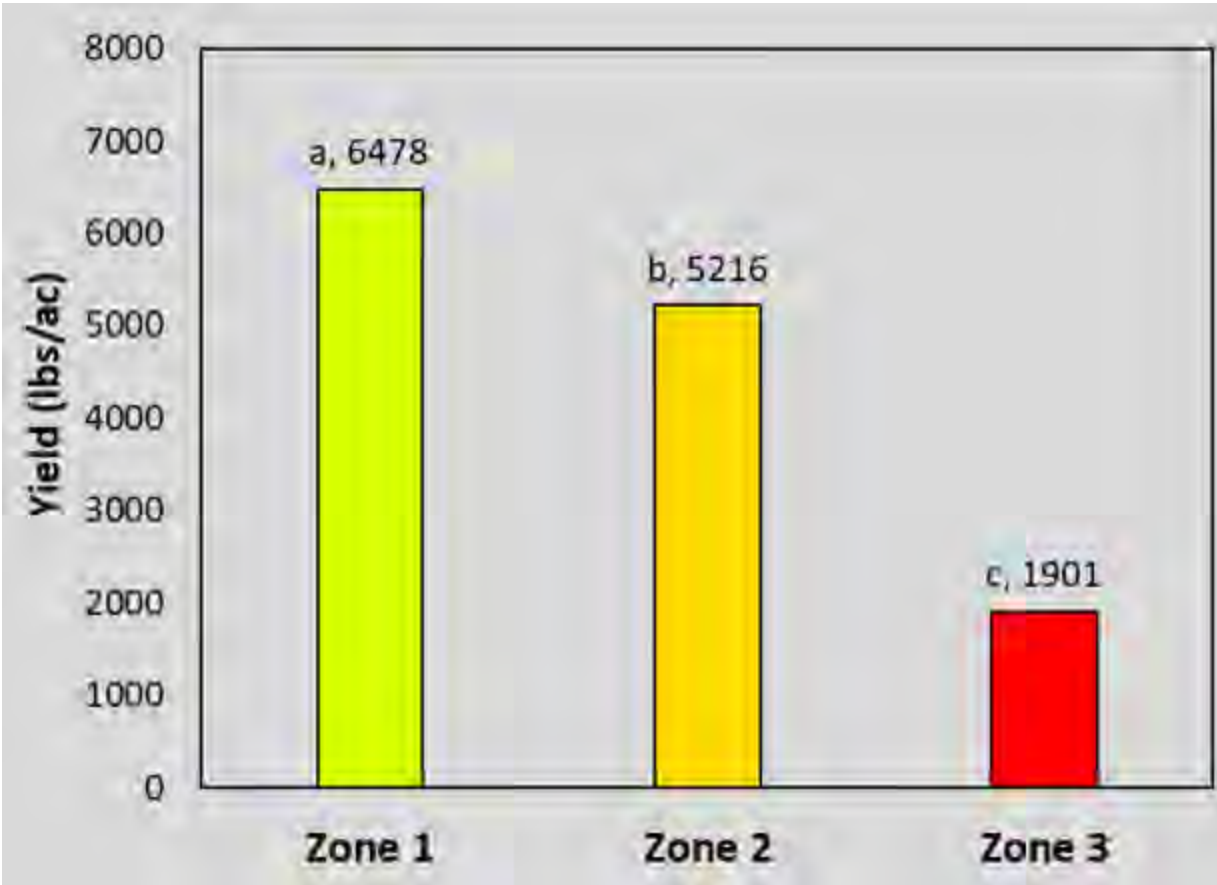


Soil pH: 5.00 – 5.50



Soil pH < 5.00





----- Uniform Application -----					
Field	Size (acres)	Rate (tons/ac)	Cost (\$/ac)	Yield (lbs/ac)	Gross Rev. (\$/ac)
Zone 1	30.5	0.5	\$19	6,478	\$1,376
Zone 2	6.2	0.5	\$19	5,216	\$1,108
Zone 3	0.8	0.5	\$19	1,901	\$404
Average/ac			\$19	6,171	\$1311

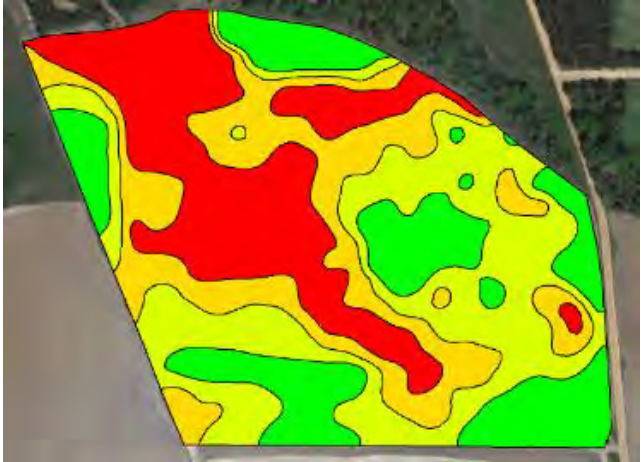
----- Variable-Rate Application -----					
Field	Size (acres)	Rate (tons/ac)	Cost (\$/ac)	Yield* (lbs/ac)	Gross Rev. (\$/ac)
Zone 1	30.5	0.5	\$19	6,478	\$1,376
Zone 2	6.2	1.0	\$38	6,000	\$1,275
Zone 3	0.8	1.5	\$57	4,000	\$850
Average/ac			\$23	6,346	\$1348

On average, past studies show average cost return of \$14-\$20 from GPS soil sampling and \$VRT

Investigating Different Precision Soil Sampling Strategies



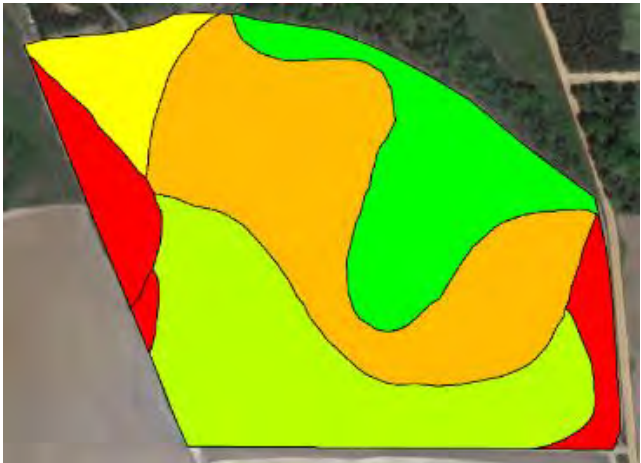
1.0 ac



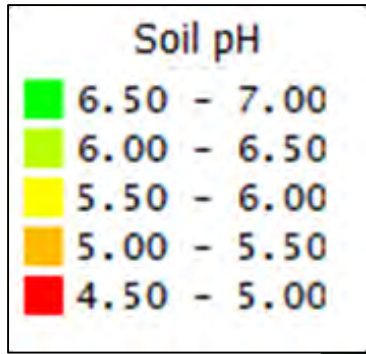
Soil EC/Texture (4 zones)



5.0 ac



Field history + Soil EC + In-season Crop Imagery (5 zones)



Actual Soil pH
Variability
(163 Samples)



1 ac
(92 samples)

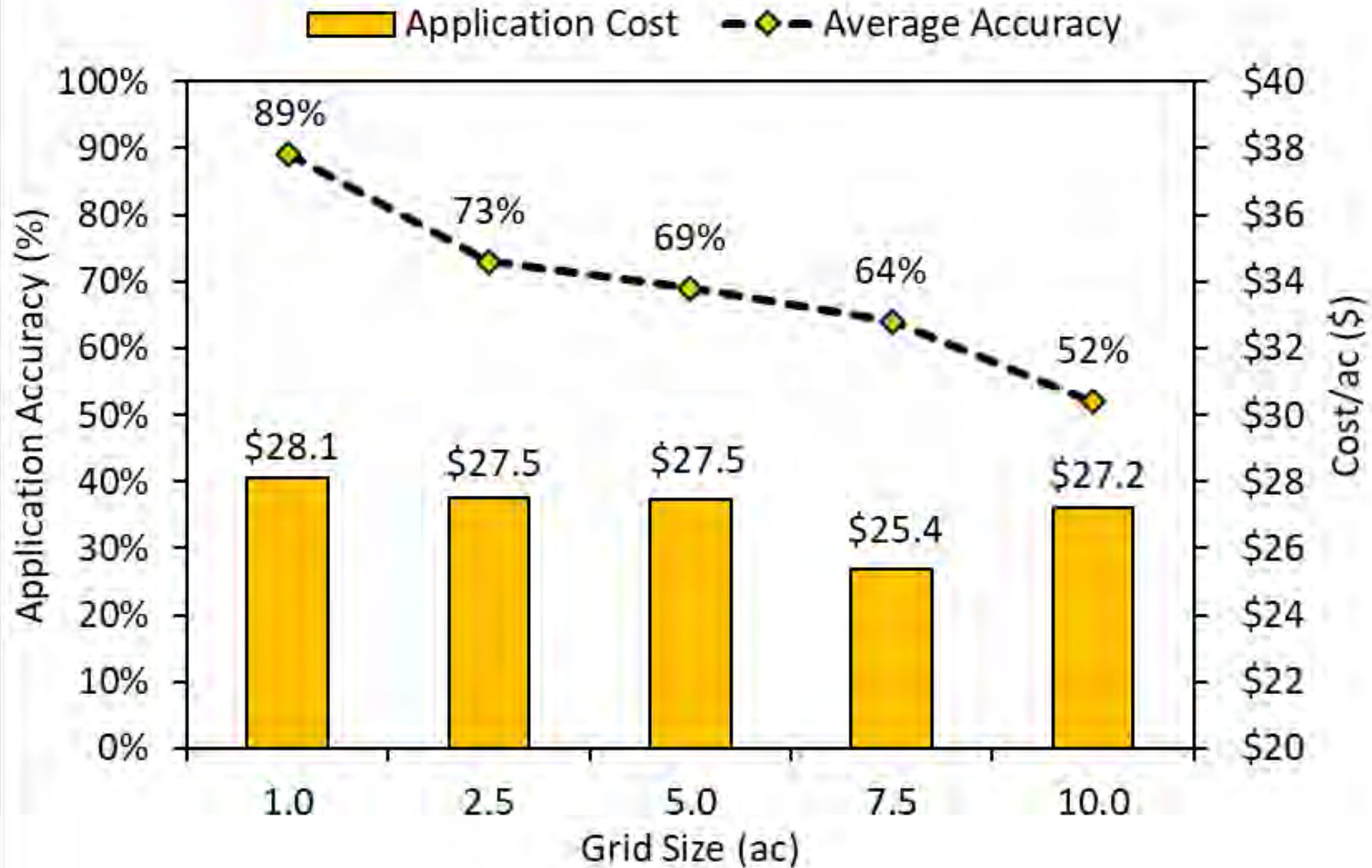


2.5 ac
(35 samples)



5 ac
(17 samples)

Variable-Rate Liming Application Accuracy and Cost



Peanut Planting – Technology Advancements

- Peanut seeding rates are considerably higher than other crops (corn and cotton)
- Planting speed is normally slower (3.0 – 3.5 mph)
- Until recently, most of the planting technology advancements have been focused primarily towards other crops (primarily corn)



Peanut Seed Metering Performance

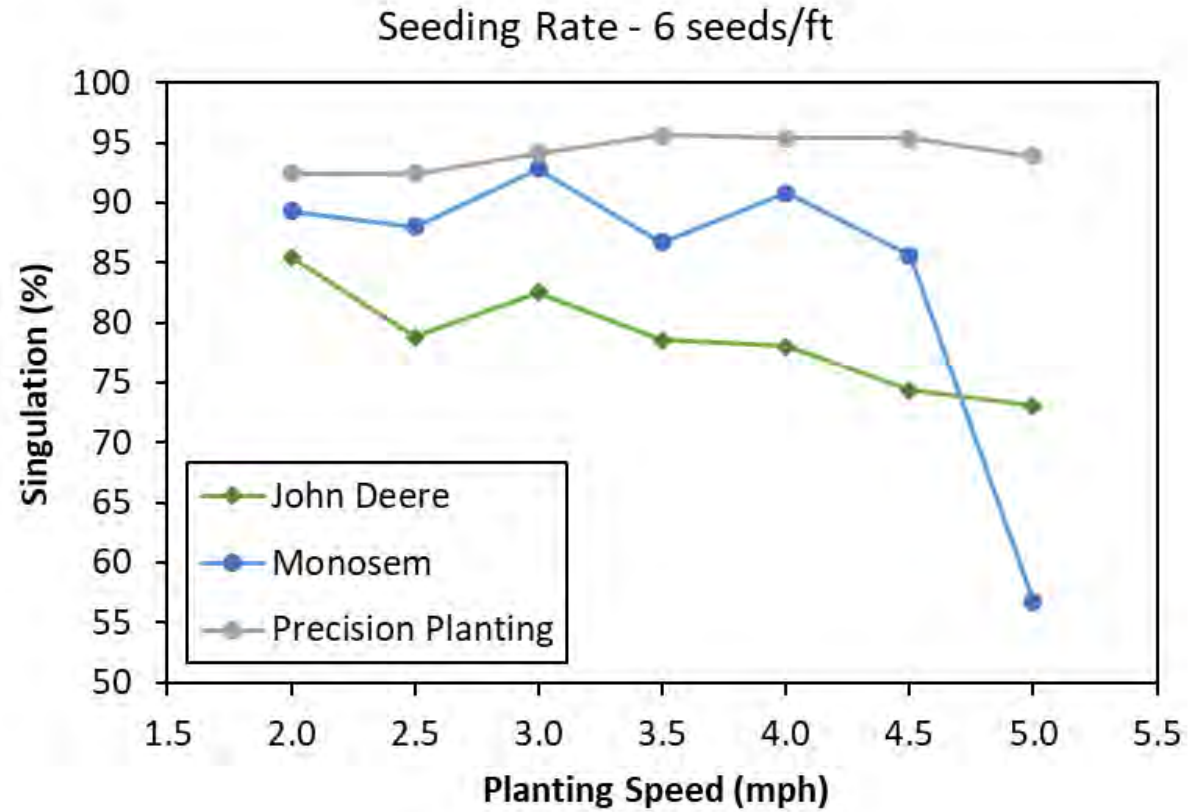
John Deere



Monosem



Precision Planting



John Deere

Planting Speed (mph)	Seeding Rate (seeds/ft)					
	3	4	5	6	7	8
2.0	90	88	88	85	87	82
2.5	90	86	84	79	78	85
3.0	90	88	84	83	77	77
3.5	86	85	81	79	77	78
4.0	85	82	78	78	73	71
4.5	91	82	78	74	71	69
5.0	84	80	75	73	71	62

Monosem

Planting Speed (mph)	Seeding Rate (seeds/ft)					
	3	4	5	6	7	8
2.0	91	90	89	89	88	92
2.5	90	92	91	88	92	87
3.0	91	89	90	93	84	86
3.5	94	91	92	87	68	67
4.0	89	91	92	91	81	53
4.5	89	92	88	86	53	44
5.0	90	89	85	57	38	34

Precision Planting

Planting Speed (mph)	Seeding Rate (seeds/ft)					
	3	4	5	6	7	8
2.0	94	90	91	92	96	94
2.5	90	91	90	92	95	93
3.0	92	91	92	94	94	97
3.5	91	92	94	96	96	95
4.0	92	92	94	95	96	91
4.5	93	92	94	95	95	96
5.0	93	95	95	94	93	-

Planting Technology

Controlled Seed Delivery:

Provides controlled seed delivery to the furrow from the seed meter



SmartFirmer:

Provides real-time information on soil properties (moisture, temp and organic matter) during planting



SmartDepth:

Enables real-time seed depth adjustments based on a preset range, soil moisture, or OM



Spray Technology



Common Nozzles used for Peanut Pest Management

Standard Flat-Fan (XR)



Air-Induction (AI XR)



Dicamba Tip (TTI)



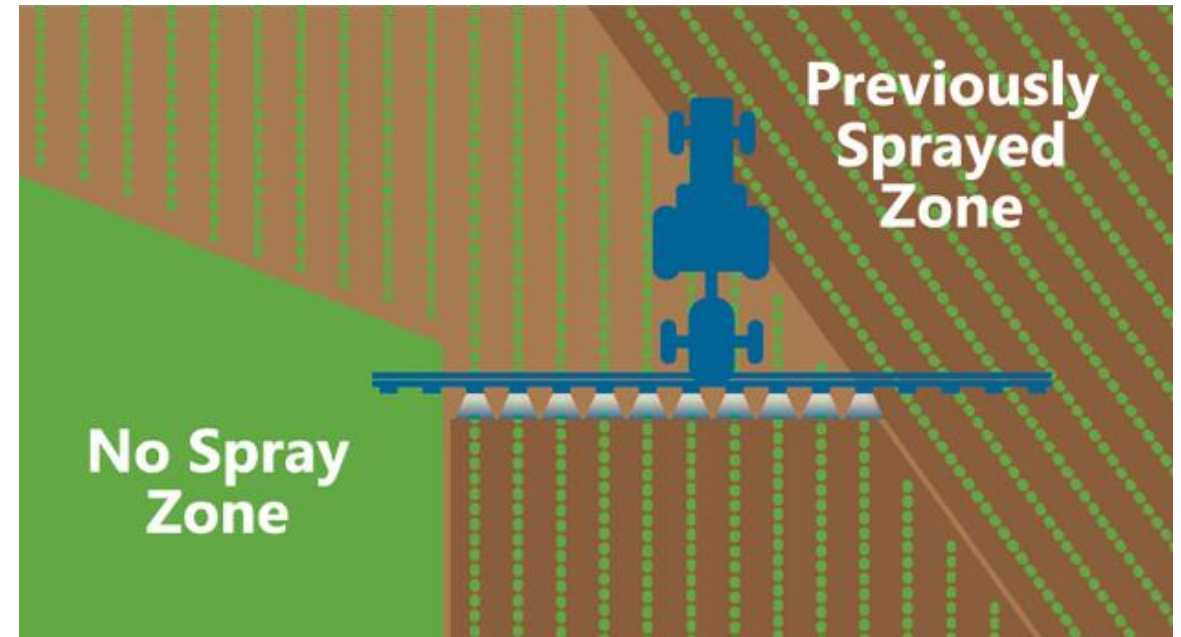
Common Nozzles used for Peanut Pest Management



Pulse-Width Modulation (PWM) Technology



Ability to maintain a consistent application rate and spray quality (droplet size) as spraying conditions change.



Site-Specific Pesticide Application Technology

See & Spray Select: Broadcast and targeted spray on fallow ground (green-on-brown)

See & Spray Ultimate: Targeted spray in the crop (corn, soybean and cotton; green-on-green)

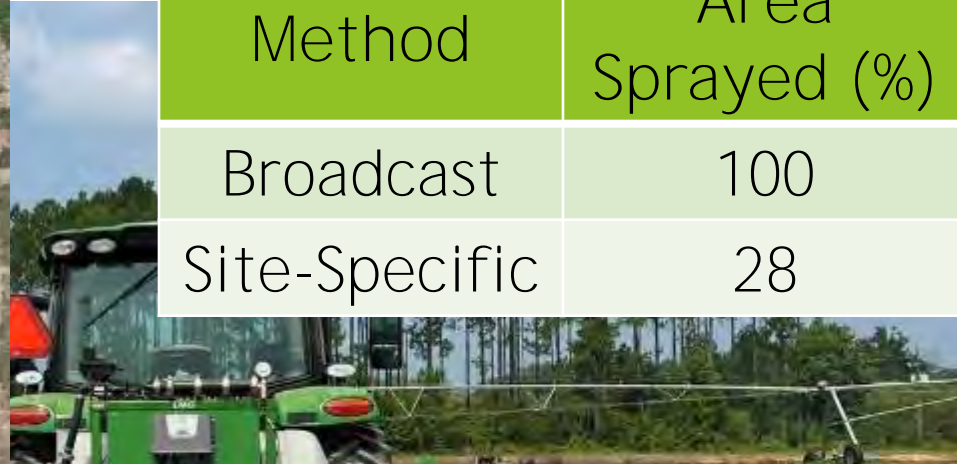


Image source: John Deere

Site-Specific Weed Management in Peanut



Site-Specific Weed Management in Peanut



Method	Area Sprayed (%)	Efficacy (%)
Broadcast	100	91.3
Site-Specific	28	91.6



Spray Drone Pesticide Applications



Thanks!

Simer Virk

Extension Precision Ag Specialist

University of Georgia

Email: svirk@uga.edu

Website: <https://agtechdata.uga.edu/>

Twitter: @PrecAgEngineer



UNIVERSITY OF GEORGIA
EXTENSION

National  **Peanut Board**[®]