

Topdressing Winter Wheat Surface vs. Sub-Surface Band



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Study Topics

- Topdressing application type
 - Sub-surface band
 - Surface band
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Topdressing Application Type

- On the High Plains rainfall events are difficult to predict both in volume and in timing.
 - Most producers topdress Nitrogen using a surface band or broadcast method. Either method require a timely rain to get the Nitrogen incorporated.
 - An alternative to surface band (or broadcast) is to place Nitrogen sub-surface. This method is more expensive (\$7.25/ac vs. \$4.50/ac).
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Topdressing Application Type

- Potential benefits to Sub-Surface Placement
 - Lower risk in that a timely rain is not necessary to move the Nitrogen to the root zone.
 - Less Nitrogen tie-up on surface residue.
 - Less Nitrogen loss potential due to volatilization.

- Potential detriments to Sub-Surface Placement.
 - Higher cost.
 - Potential for yield loss due to damage of crown roots by coulters.
 - Narrower window for application in wet years (tractor vs. sprayer).

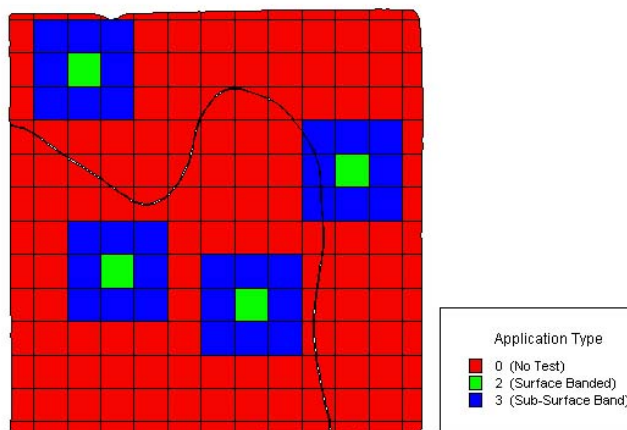
Equipment -40' DMI toolbar on 15'' centers.



Project Description

- To simulate surface band the DMI coultter machine was raised out of the ground over the test plots.
- One-Acre test plots were scattered across all fields that resulted in a total of eight test plots across two fields.
- The eight one-acre grids around the test plot were average to represent the “control” plot to be tested against the test plot.

Plot Example



Analysis

- Fertilizer applied with DMI 40', direct-injection toolbar. Mapping done with Farmworks SiteMate VRA.
- Yield data collected with John Deere Greenstar systems
- All Yield data was processed through MPGM program which resulted in a grid based yield map (60' grids).
- All data were merged together using MapInfo and in-house built scripts and aggregated at a 1 acre level.
- All data were then exported to Excel for analysis.
- Paired Ttest's were used to evaluate the treatments.

Results -2007

| | | | | Prob Value | Confidence |
|----------|--------|--------------|--------------|----------------------|------------|
| | | | | 0.826 | 17% |
| | | 45.21 | 45.50 | average Yield | |
| Field | obs_ID | Sub-Surface | Surface-band | | |
| HkLane | 1 | 35.60 | 36.72 | | |
| HkLane | 2 | 36.17 | 45.48 | | |
| HkLane | 3 | 38.93 | 40.60 | | |
| HorRanch | 6 | 48.49 | 42.49 | | |
| HorRanch | 7 | 52.96 | 51.74 | | |
| PeteSW80 | 9 | 48.53 | 53.44 | | |
| PeteSW80 | 10 | 52.47 | 55.35 | | |
| PeteSW80 | 11 | 54.30 | 54.32 | | |
| TerQTR | 12 | 46.48 | 47.87 | | |
| TerQTR | 13 | 40.46 | 36.60 | | |
| TerQTR | 14 | 41.06 | 34.62 | | |
| TerQTR | 15 | 47.02 | 46.70 | | |

Results -2008

Application made 3/27/08
 DMI 2800 Nutri-Placer on 15" centers
 K&K BoltePivotE & K&KBoltePivotW
 Dryland re-cropped wheat in corn stalks

Rainfall timing
 4/3/2008 0.14
 4/10/2008 1.63

| | | | |
|----------|----------------|--------------------|-----|
| Avg | 25.86 | 25.16 | |
| STD | 3.55 | 1.93 | |
| CV | 0.14 | 0.08 | |
| Adv Sub | | -0.71 | |
| T(2tail) | | 0.6275927 | 37% |
| | <u>Surface</u> | <u>Sub-Surface</u> | |
| 1 | 22.00 | 23.79 | |
| 2 | 27.40 | 25.72 | |
| 3 | 27.89 | 28.05 | |
| 4 | 27.90 | 24.83 | |
| 5 | 21.70 | 23.59 | |
| 6 | 25.54 | 26.75 | |
| 7 | 31.78 | 26.34 | |
| 8 | 22.69 | 22.17 | |

Conclusions 2007 & 2008

- As shown in the table, there was no statistically significant difference between Sub-Surface and Surface banding of Nitrogen on the study area in either 2007 or 2008.
- In 2007, topdressing occurred on March 20.
- In 2008, topdressing occurred on March 27.
- In 2007, 1.51" of rainfall within 9 days.
- In 2008, 1.77" of rainfall within 14 days.

Conclusions

- With at least 1.5" of rainfall being received within fourteen days of the topdressing operation in each year, there were no inherent yield advantages to sub-surface placement of the Nitrogen.

