USE OF AIRFLOW TECHNOLOGY IN GRANULAR FERTILIZER APPLICATION DELIVERS HIGHER YIELDS.*

* According to independent studies conducted by Jackson State Community College, Jackson, TN
One area of study is the impact of fertilizer distribution on crop development and yield. We have studied the difference between spinner applicators, liquid application systems and air boom spreader systems. We have combined image analysis with yield maps to investigate the difference between these systems.

In our studies we have found that most often the spinner spreader system, when used in an operational environment as we have observed in total farm scale production studies, often result in pronounced streaking. This is usually most evident in either nitrogen application or when lime is spread on a 50 foot spinner pattern.

We have observed that there can be as much as 250 pounds of lint yield difference within a 50 foot spinner spreader pattern for both lime and nitrogen.

When this is compared to either a liquid system or air boom system, we have not observed this level of streaking impact. Liquid application systems and dry air boom systems did not exhibit significant streaking within the patterns.

In our studies we have used mainly rolling coulter applicators for liquid fertilizer and we have used the Valmar Air Boom spreader for our dry fertilizer applications. We have specifically modified the Valmar Air Boom Spreader for Variable Rate Dry Fertilizer Application. This system was not set up for multi-product application. We have found that the Valmar Air Boom Spreader VR application system worked very well.

We have installed a much larger study this year to directly compare spinner-applied top dress nitrogen to the Valmar Air Boom system to further confirm earlier observations.

Tim Sharp
Department Chairman, Agriculture
Jackson State Community College
2046 North Parkway, Jackson, TN 38301
tsharp@jscc.edu

* Note: The Valmar Airflo uses the same patented technology seen on the AirMax system manufactured by LOR AL and AgChem.
Uneven Distribution of Lime and Fertilizer Can Reduce Crop Yields

“Research conducted at Virginia Polytechnic Institute and State University indicates that when one area of the field is over-fertilized and another is under-fertilized, the total yield will be less than if the correct amount of fertilizer were spread evenly over the entire field.... On the low fertility soil, maximum yields of wheat occurred where the fertilizer had been spread uniformly.... In cases where the fertilizer had been applied in a skewed or non-uniform pattern, yields were reduced by 20% to 25%.... A similar response was obtained using corn as the test crop. The results of this research proved conclusively that non-uniform application of fertilizers resulted in less total yield than uniformly applied fertilizers, even though the same total rate per acre had been applied in each case.... Spreading problems can occur with both lime and fertilizer materials on farm fields.... Applicators should be calibrated for each kind and rate of material applied....

... Problems of spinner spreaders include:
- Uneven distribution patterns
- Lack of operator understanding of calibration and adjustment procedures
- Material drift

Source: Maryland Co-operative Extension
University of Maryland College Park, Eastern Shore
Publication: EB-254

Table 6-13.

Yield Loss Associated with Inaccurate Nitrogen Application Patterns

<table>
<thead>
<tr>
<th>Application Rate (kg/ha)</th>
<th>Low N</th>
<th>Full N</th>
</tr>
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<tbody>
<tr>
<td>Low N</td>
<td>3.72 (55.3)</td>
<td></td>
</tr>
<tr>
<td>Full N</td>
<td>5.20 (77.3)</td>
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Note: Based on two locations in Middlesex County, Ontario.

Source: Ontario Ministry of Agriculture and Food (OMAF). Excerpt from Agronomy Guide for Field Crops (Chapter 6)
OMAF Publication 811: Agronomy Guide for Field Crops

OMAF Reports a 28% Difference in Yields Between Under and Fully Fertilized Strips in Cereal Crops

“Uniformity of Nitrogen Fertilizer Application

To maximize yield, nitrogen must be applied uniformly across the field. Uniform application is more critical than the form of nitrogen fertilizer applied. Table 6-13, Yield Loss Associated with Inaccurate Nitrogen Application Patterns shows the yield loss associated with inaccurate spread patterns. A 1.48 t/ha (22 bu/ac) yield difference was found between the fully fertilized and under-fertilized strips in the field.

Spreader applications are not recommended for nitrogen application on cereals, due to the inconsistency of their spread pattern. If spinners are employed, consider double spreading the field (6 m or 20 ft centres at half the rate, instead of 12 m or 40 ft centres) to overcome this inconsistency.”

Distribution Pattern Shifts Observed with VR Spinner Spreader

“Another issue observed with VR spinner spreaders is distribution pattern shifts. Undesirable distribution patterns are sometimes created at different application rates. These different patterns indicate that spreader settings need to be simultaneously adjusted during rate changes to maintain a desirable distribution pattern.”

Source: UK Co-operative Extension Service
University of Kentucky, College of Agriculture
Site Specific Issues - A Precision Agriculture Newsletter
Spring Planting 2003

Article: VR Fertilizer and Lime Application
By: John Fulton, Research Engineer, Biosystems and Agricultural Engineering Department, University of Kentucky

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<th>Application Rate (kg/ha)</th>
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<th>Medium</th>
<th>High</th>
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<tr>
<td>Yield t/ha (bu/ac)</td>
<td>200</td>
<td>180</td>
<td>160</td>
</tr>
<tr>
<td>Low</td>
<td>100</td>
<td>80</td>
<td>60</td>
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Distribution patterns shifts with changes in application rate

Source: Ontario Ministry of Agriculture and Food (OMAF). Excerpt from Agronomy Guide for Field Crops (Chapter 6)
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Yield t/ha (bu/ac)

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Photo 4: Aerial Digital Multispectral Image
Image shows that application with an airflo boom spreader will over time reduce and eliminate streaking. Note: This is the same field as shown in Photo 3.

Photo 5: Aerial Digital Multispectral Image
Image shows streaking caused by continued misapplication will be evident for years to come.

Photo 6: Aerial Digital Multispectral Image – Airflow Boom Spreader
Image shows uniform application of nitrogen by an airflow boom spreader.

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TO IMPROVE YOUR GRANULAR FERTILIZER PLACEMENT AND INCREASE YOUR YIELDS, CONTACT:

AG CHEM APPLICATION DIVISION
202 INDUSTRIAL PARK
JACKSON, MINNESOTA
USA 56143
(507) 847-2690
www.agchem.com

VALMAR AIRFLO INC.
BOX 100, ELIE, MB
CANADA ROH OHO
(204) 353-2782
www.valmar.com