Background

- It is important to take stock of present grower fertilization practices, particularly in respect to the 4Rs of Nutrient Management – Right Source, at Right Rate, Timing and Place.
- A questionnaire commissioned by Manitoba Corn Growers Association was conducted by Stratus Ag Research with 100 Manitoba corn growers.
- This survey was conducted in spring 2018 and referred to the 2017 corn crop.
- Reminder: Fall 2016 was very wet, hindering more traditional fall fertilization for this 2017 corn crop. This may bias the fertilization timing results somewhat.
- Results are contrasted with general findings from the Manitoba Agricultural Services Corporation (MASC) Management Plus Fertilizer Browser.

Findings versus MASC Data

Table 1. Average corn yield and fertilizer rates for 2017 from MASC data base results and the MCGA survey.

<table>
<thead>
<tr>
<th>Number of Growers ( and acres)</th>
<th>MASC Data</th>
<th>MCGA study</th>
</tr>
</thead>
<tbody>
<tr>
<td>323 (364,609 acres)</td>
<td>323</td>
<td>100</td>
</tr>
</tbody>
</table>

Yield achieved bu/ac: 134.7
Nitrogen rate lb N/ac: 135
Phosphorus rate lb P₂O₅/ac: 41
Potassium rate lb K₂O/ac: 22.5

Yield and fertilizer rates match very well.

General Practices of Manitoba farmers

- No single practice or combination of placement and/or timing predominated corn fertilization. The fertilizer source, especially nitrogen (N), was matched with timing.
- 24% of farmers used manure: 21% applied manure in fall, 8% in the spring.
- 19% of farmers planted all their 2017 corn following a N-fixing crop (peas, beans, soybeans or forage legume). 26% planted some of their corn after N-fixing crops while 55% did not follow any N-fixing crops.
- 11% of farmers used enhanced efficiency fertilizers (like ESN, SuperU) and Micronutrient use was low: 5% applied zinc, 2% applied boron and 1% applied copper.

Grower Decision Making on Fertilizer Rates

Table 2. Differences in fertilization practices based upon grower’s 4R familiarity.

<table>
<thead>
<tr>
<th>4R Knowledge</th>
<th>Apply in-crop N</th>
<th>Apply fall P</th>
<th>Apply fall K</th>
<th>Apply S</th>
<th>VR all or some</th>
<th>Same fertilizer rate all fields</th>
<th>Average Yields bu/ac Target (Actual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very familiar</td>
<td>30</td>
<td>20</td>
<td>17</td>
<td>36</td>
<td>62*</td>
<td>82*</td>
<td>152 (146)</td>
</tr>
<tr>
<td>Somewhat familiar</td>
<td>27</td>
<td>17</td>
<td>16</td>
<td>49</td>
<td>21</td>
<td>61</td>
<td>145 (134)</td>
</tr>
<tr>
<td>Knew nothing/new heard of it</td>
<td>8*</td>
<td>6*</td>
<td>9*</td>
<td>59</td>
<td>6*</td>
<td>66</td>
<td>141 (130)</td>
</tr>
</tbody>
</table>

Phosphorus, Potassium and Sulphur – Timing & Placement & Sources

- Phosphorus (P) was primarily seedplaced or sidebanded at seeding (52% of acres), followed by preplant broadcast and incorporated (22%), and fall band applications (23%) (Fig 4).
- Most of the corn after N-fixing crops was applied at seeding with the seed (Fig 5).
- Variable rate apply fertilizers: 4% applied at seed with the seed, 5% applied at placement, and 5% applied at banding (Fig 4).
- N fertilizer rates were highest in fall (32%), followed by preplant (23%), at seeding (19%) and in-crop (7%) (Fig 4).

Survey Source and References

This survey contains additional valuable information on fertilizer use practices. Results can be accessed by contacting MCGA http://manitobacorn.ca/

* Manitoba Agriculture, †Manitoba Corn Growers Association

Figure 1. Approaches to determine nitrogen and phosphorus rates.
- The most used approaches for determining fertilizer rates were soil testing (by 68-71%), nutrient balance (34-39%) and past grower experience (32-35%).
- Provincial fertilizer rate guidelines were rarely used.

Figure 4. Phosphorus, potassium and sulphur timing and placement.
- Those farmers with greatest 4R knowledge applied S most frequently to fields and were least likely to apply the same fertilizer rate to all fields (Table 2).
- Those farmers least familiar with 4R approach were least apt to apply in-crop N, or fall P and K. They were also least likely to variable rate apply fertilizers.
- Generally those with greater 4R familiarity had higher yield targets and achieved higher yield.

Figure 3. Nitrogen timing and source.
- Nitrogen (N) was matched with timing, although not determined in this survey, it is recognized that growers prefer fall applications on heavier textured soils, versus spring applications on sander, leaching prone soils.
- 66% of corn acres had all or a portion of the N applied in a subsurface band.
- Predominant N sources were anhydrous ammonia for fall banding, urea for spring application and UAN for in-crop (Fig 3).

Figure 5. Phosphorus, potassium and sulphur sources for corn.
- Phosphorus (P) was primarily seedplaced or sidebanded at seeding (52% of acres), followed by preplant broadcast and incorporated (22%), and fall band applications (23%).
- MAP was the most common P source. Liquid forms (AP, starter blends) were primarily used on the 2017 corn crop. This may bias the fertilization timing results somewhat.
- Results are contrasted with general findings from the Manitoba Agricultural Services Corporation (MASC) Management Plus Fertilizer Browser.

Figure 2. Nitrogen timing and placement.