

Fertilization Practices of Manitoba Corn Growers

J. Heard¹ and M. Cott²

¹ Manitoba Agriculture, ² Manitoba Corn Growers Association



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 Browser¹.

Findings versus MASC Data

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

	MASC Data	MCGA study
Number of Growers (and acres)	323 (354,609 acres)	100
Yield achieved bu/ac	134.7	136.3 (Target of 145.9)
Nitrogen rate lb N/ac	135	141
Phosphorus rate lb P ₂ O ₅ /ac	41	39
Potassium rate lb K ₂ O/ac	22.5	24

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)
- Micronutrient use was low: 5% applied zinc, 2% applied boron and 1% applied copper

Grower Decision Making on Fertilizer Rates

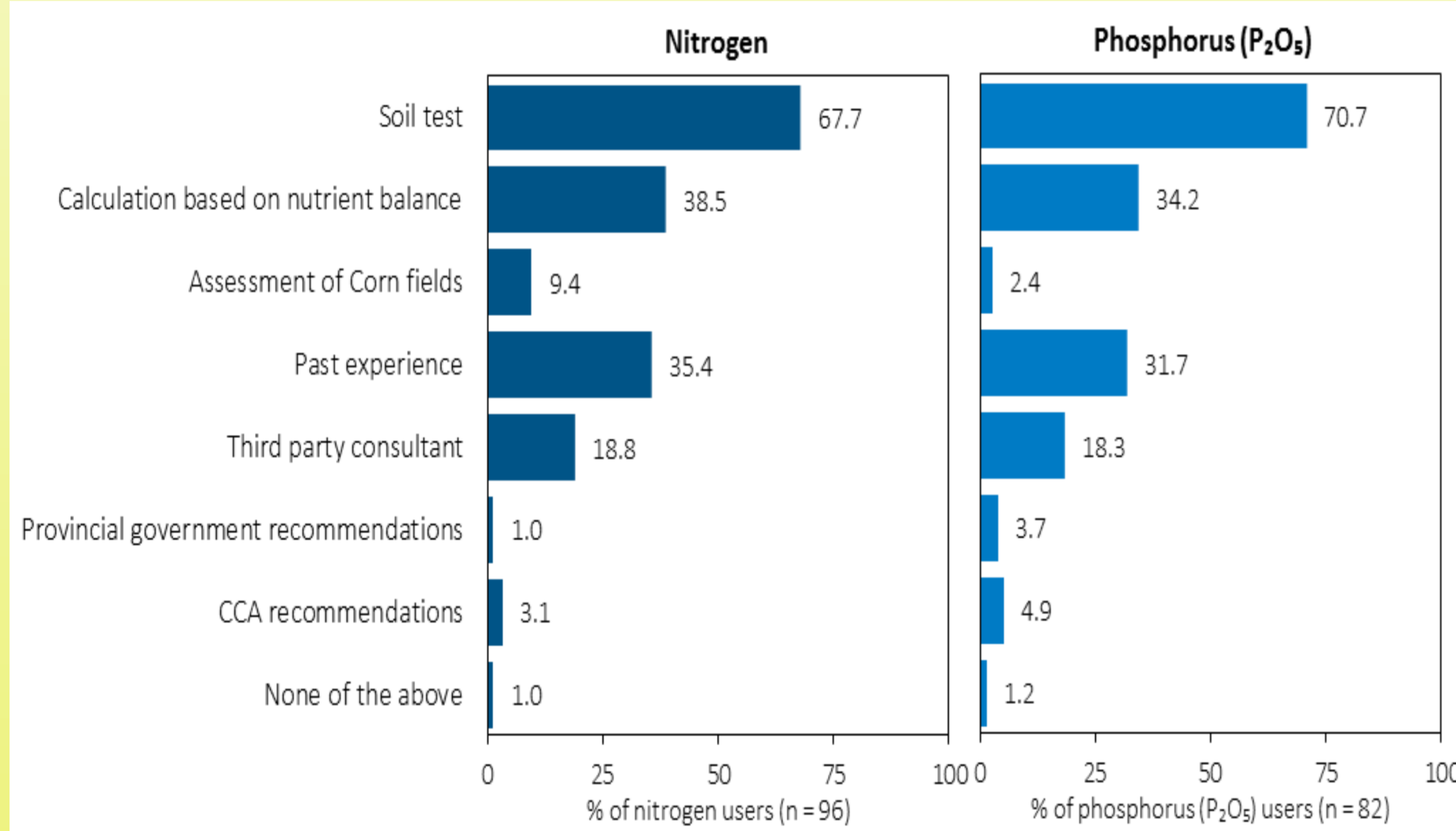


Figure 1. Approaches to determine nitrogen and phosphorus rates.

- 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.

Survey Source and References

This survey contains additional valuable information on fertilizer use practices. Results can be accessed by contacting MCGA <http://manitobacorn.ca/>
¹ https://www.masc.mb.ca/masc.nsf/mmpp_browser_fertilizer.html

Nitrogen –Timing & Placement, Timing & Source

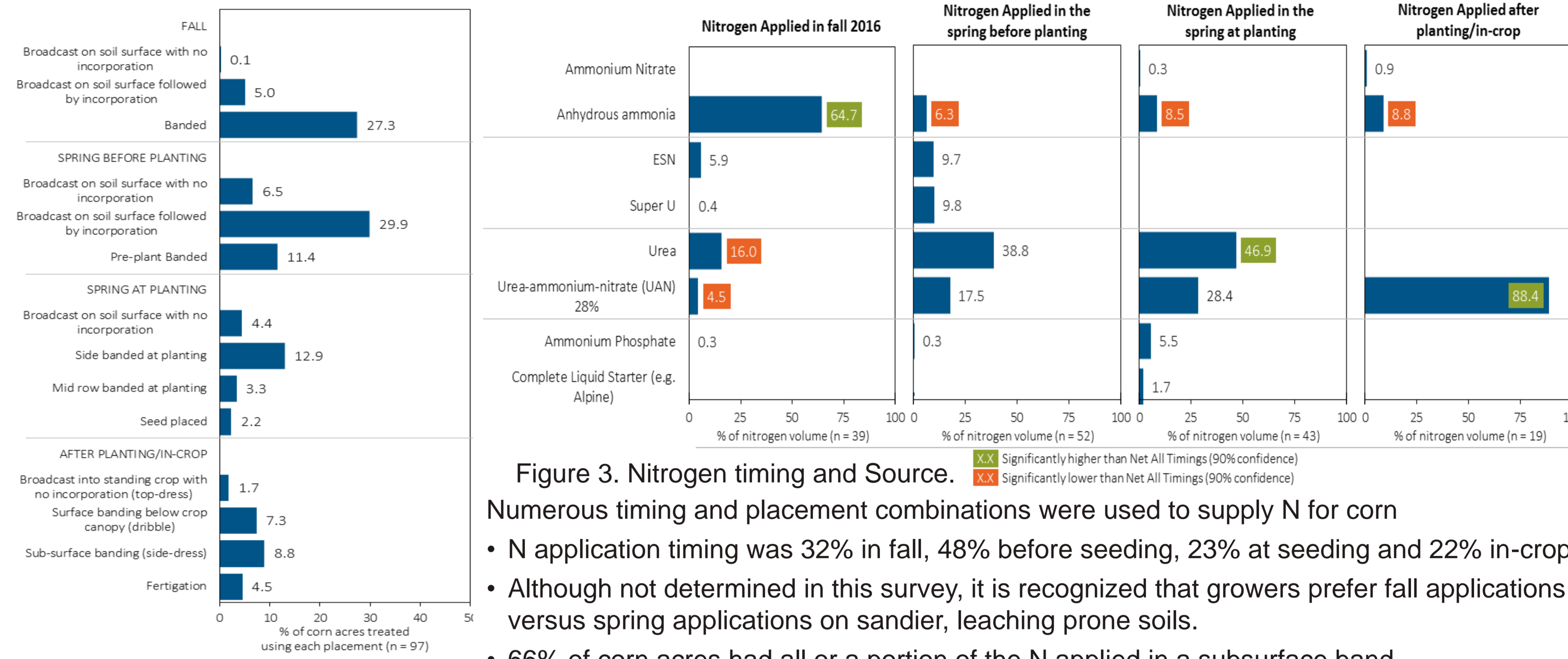
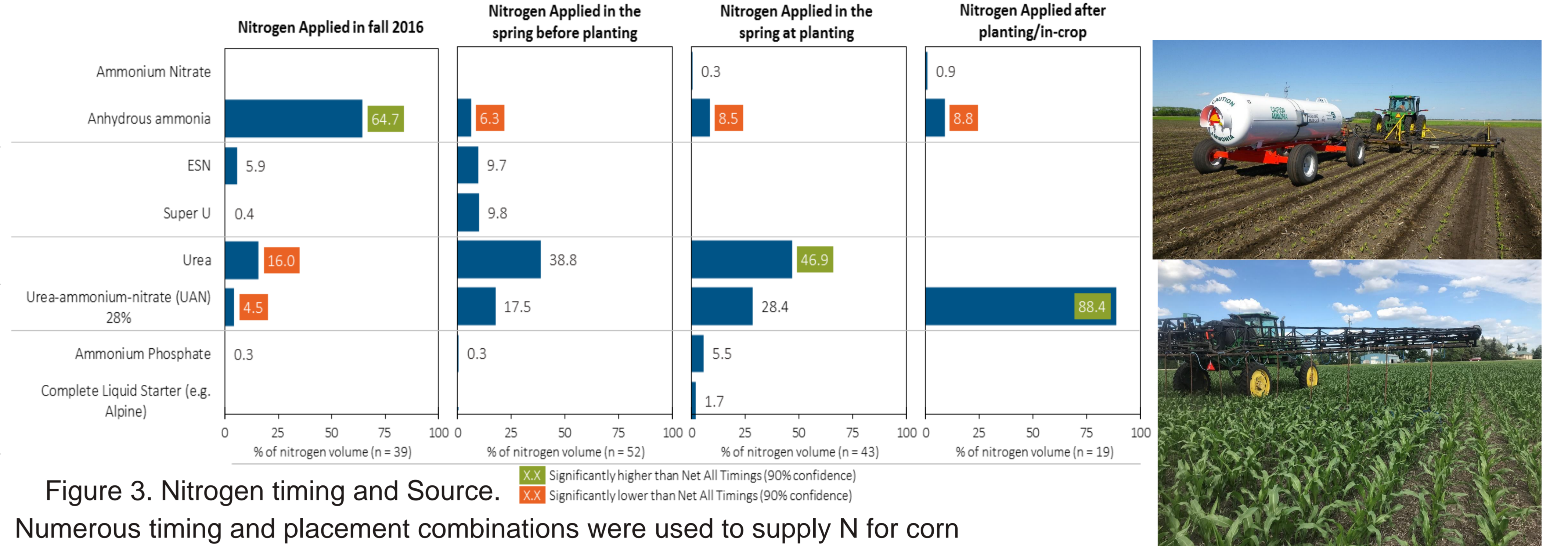


Figure 2. Nitrogen timing and placement.



- Figure 3. Nitrogen timing and Source. Numerous timing and placement combinations were used to supply N for corn
- N application timing was 32% in fall, 48% before seeding, 23% at seeding and 22% in-crop, for 2017 (Fig.2)
 - Although not determined in this survey, it is recognized that growers prefer fall applications on heavier textured soils, versus spring applications on sandier, 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).

Phosphorus, Potassium and Sulphur – Timing & Placement & Sources

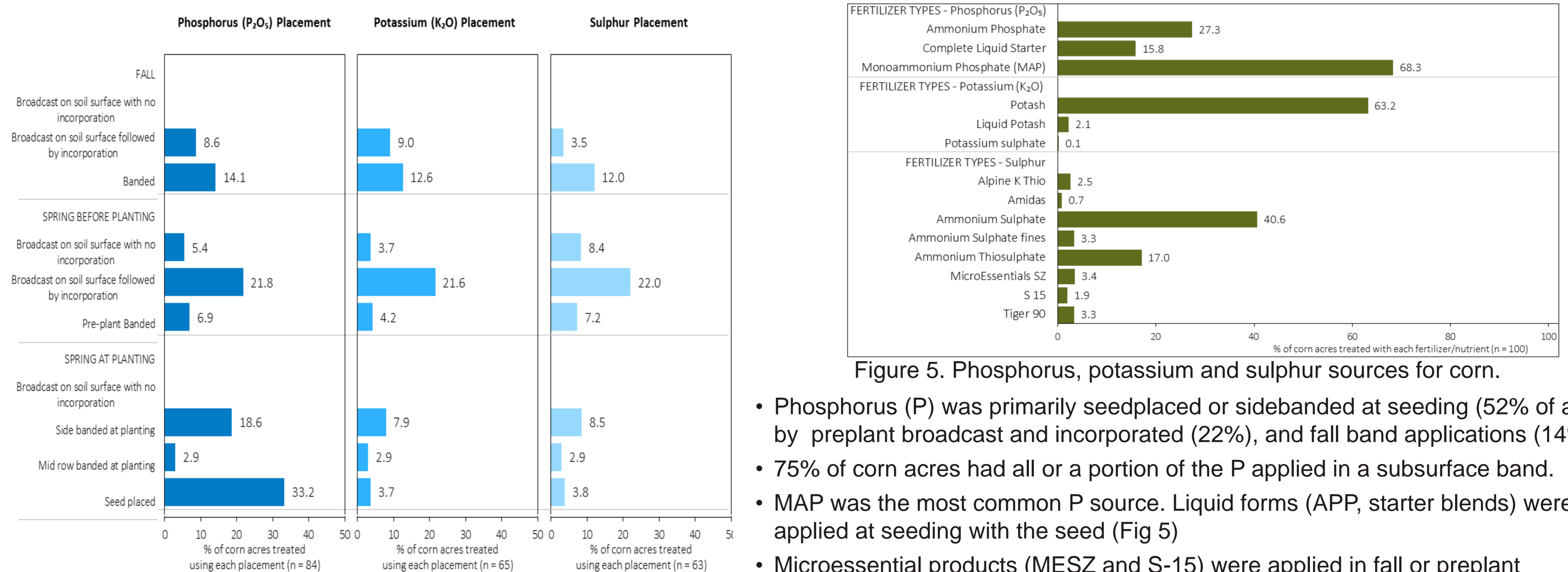


Figure 4. Phosphorus, potassium and sulphur timing and placement.

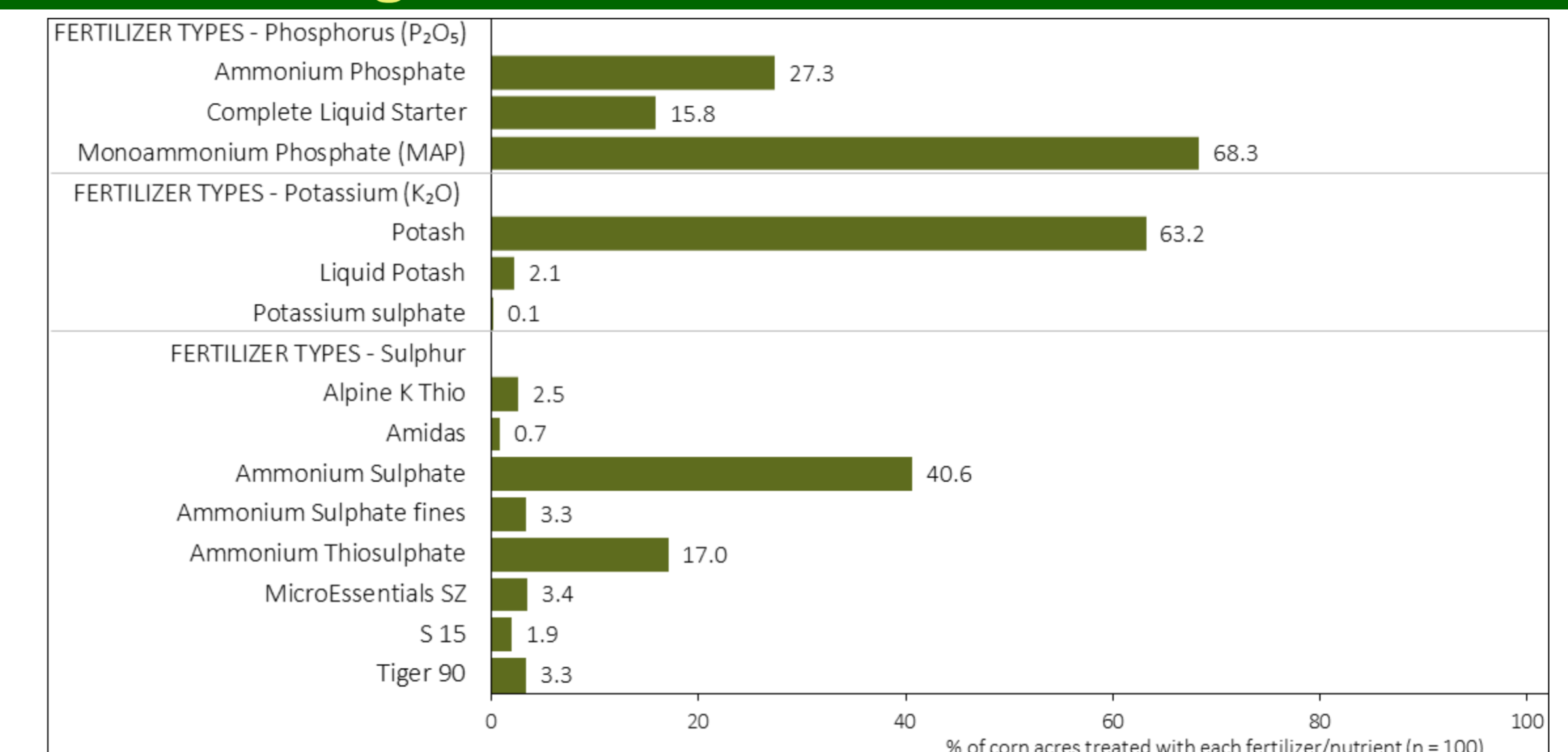


Figure 5. Phosphorus, potassium and sulphur sources for corn.

- Phosphorus (P) was primarily seedplaced or sidebanded at seeding (52% of acres), followed by preplant broadcast and incorporated (22%), and fall band applications (14%) (Fig 4).
- 75% of corn acres had all or a portion of the P applied in a subsurface band.
- MAP was the most common P source. Liquid forms (APP, starter blends) were primarily applied at seeding with the seed (Fig 5)
- Microessential products (MESZ and S-15) were applied in fall or preplant
- Potash and sulphur were applied on 2/3 of farms, more commonly broadcast/incorporated in spring (22% of fertilized acres) or fall banded (12%) (Fig 4)

Practices and Knowledge of 4R Approach

Respondents categorized themselves according to their familiarity of the 4R Nutrient program: Very familiar, Somewhat Familiar or Knew nothing or never heard of it. Those practices that differed significantly based on 4R knowledge are listed in Table 2.

Table 2. Differences in fertilization practices based upon grower's 4R familiarity. Values followed with an asterisk (*) are significantly higher or lower than other values in that column (90% confidence).

4R Knowledge (# growers)	Apply in-crop N	Apply fall P	Apply fall K	Apply S	VR all or some	Same fertilizer rate all fields	Average Yields bu/ac Target (Actual)
	% of acres						
Very familiar (33)	30	40	36	82*	34	34*	152 (146)
Somewhat familiar (35)	26	17	16	49	21	61	145 (134)
Knew nothing /never heard of it (32)	8*	6*	9*	59	6*	66	141 (130)

- 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

