Using Remote-Sensing and Grower Surveys to Identify Opportunities for Improved Nitrogen Management

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INTRODUCTION

Remote-sensing survey

- In order to determine which crops growers plant following alfalfa and whether there is opportunity to better utilize the large N supply following alfalfa, remotely sensed USDA-NASS cropland data layers (CDLs) were combined and analyzed.

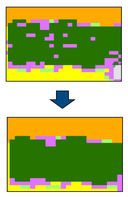
Grower survey

- In order to assess the adoption rate of Extension N rate guidelines for first- and second-year corn grown after alfalfa, all Minnesota growers (2,196) that had ≥100 acres of alfalfa and 50 acres of corn were asked to participate in a survey in 2012.

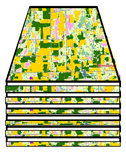
MATERIALS & METHODS

Remote-sensing survey

1. Generalize CDLs



2. Combine 2006-2012 raster CDLs

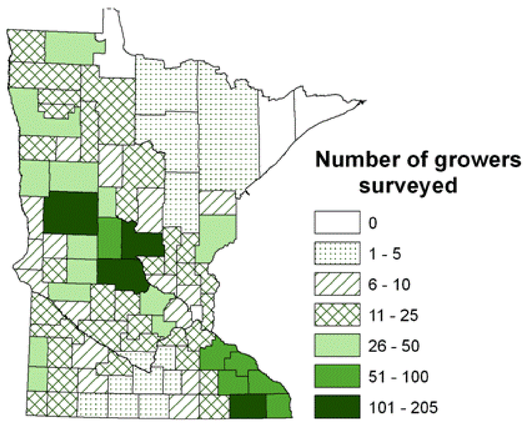


3. Convert to polygons

4. Select polygons w/alfalfa and >1 ac in size

5. Select rotations

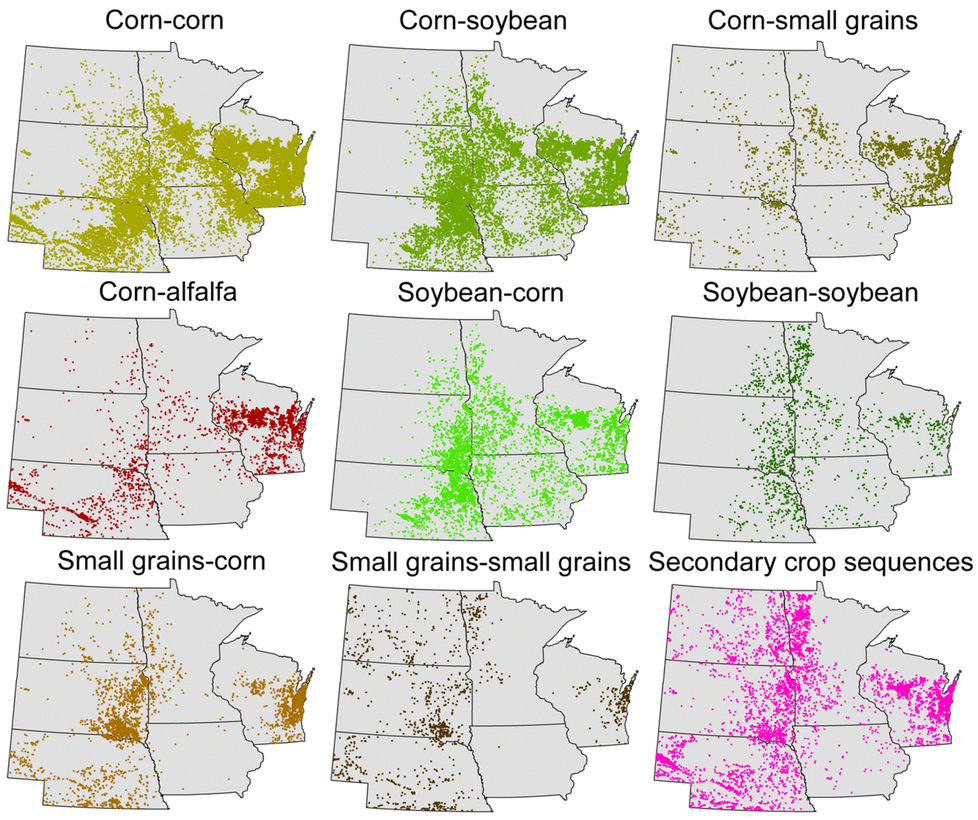
Grower survey



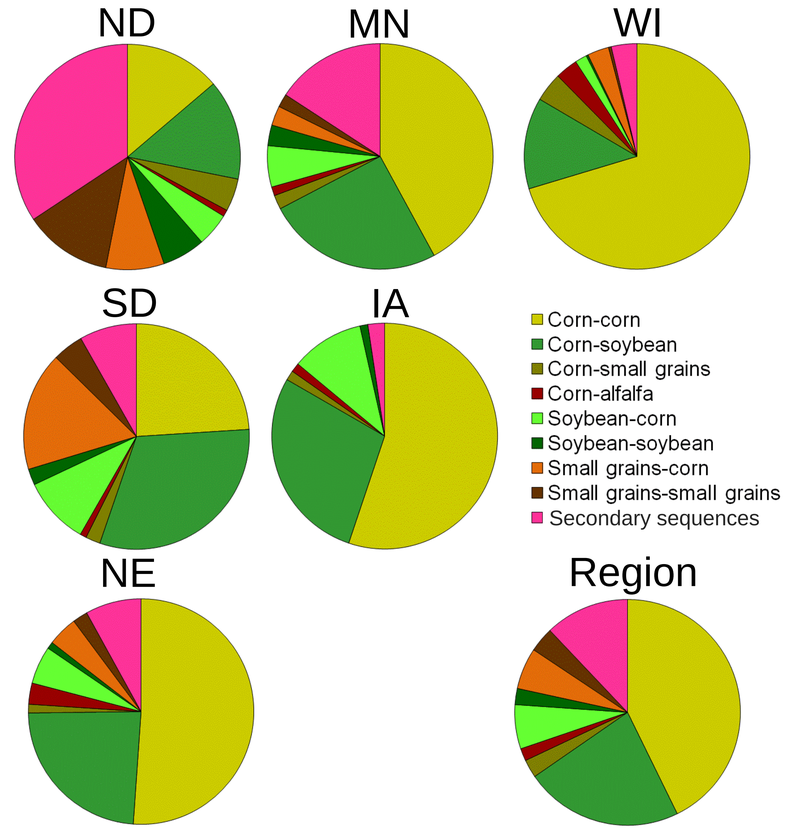
- Growers reported: i) fertilizer and manure N rates applied to first-year corn following alfalfa in 2009 or 2010 with second-year corn in 2010 or 2011; and ii) factors used to determine N rates.
- The total N rates (fertilizer N + manure N + alfalfa N credits) reported by growers were compared to the extension guideline rate of 160 lb N ac^{-1} for corn.
- Adoption was considered as ≤10 or ≤20% above guidelines when no manure or manure was applied, respectively.

REMOTE-SENSING SURVEY RESULTS

Spatial distribution of the two crops following alfalfa



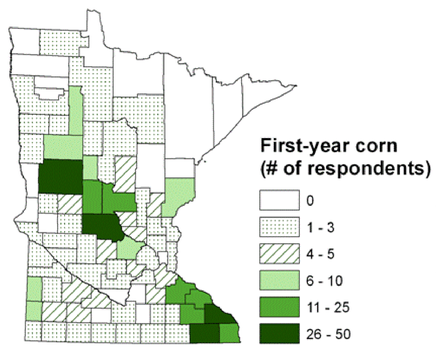
Proportion of the two crops following alfalfa by state



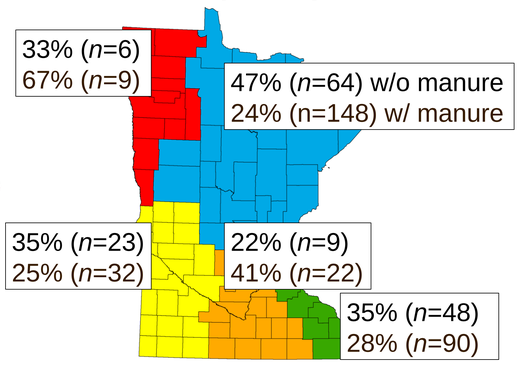
More cereals and less legumes following alfalfa should improve utilization of large N supply following alfalfa

FIRST-YEAR CORN FOLLOWING ALFALFA
Grower Survey Results

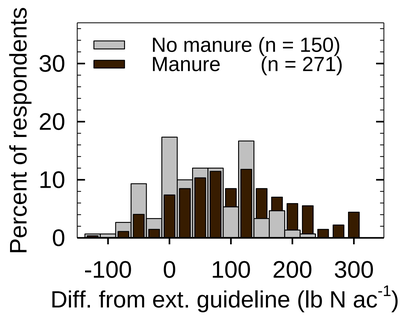
Location of respondents



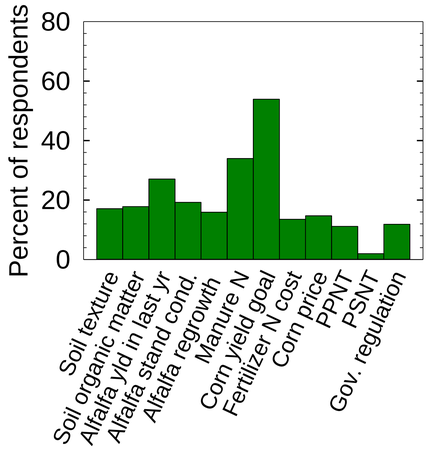
Percent adoption by BMP zone



Total N rates used by respondents



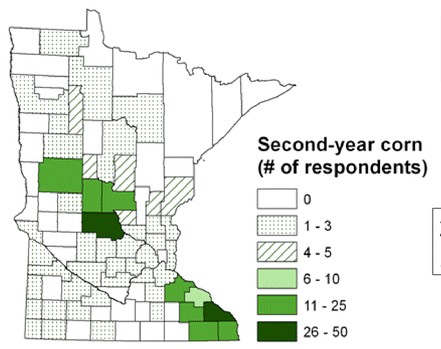
Factors used by respondents to determine N rates



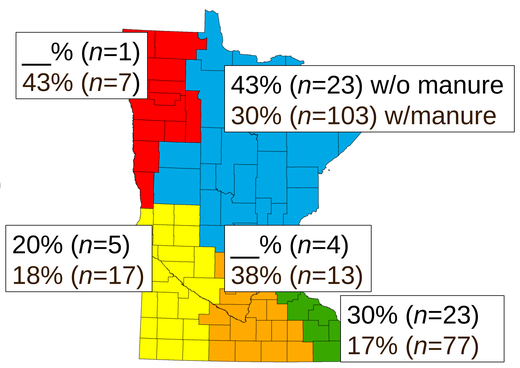
Increased adoption needed

SECOND-YEAR CORN FOLLOWING ALFALFA
Grower Survey Results

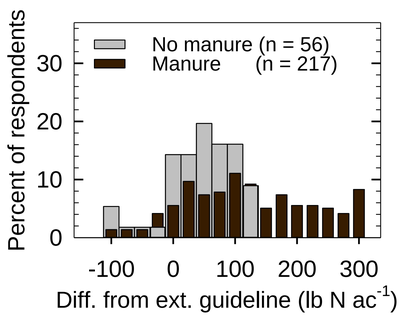
Location of respondents



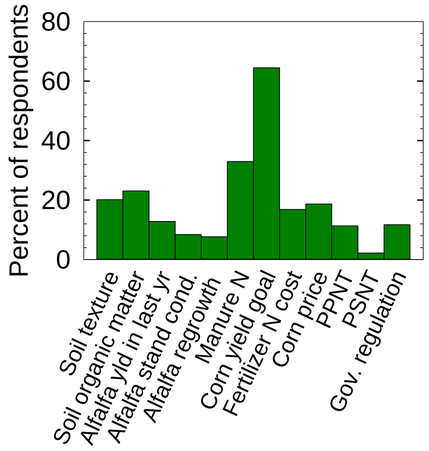
Percent adoption by BMP zone



Total N rates used by respondents



Factors used by respondents to determine N rates



Increased adoption needed