

Expanding the Manure Application Window by Application to Growing Crops

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THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL,
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4-R's

-
- **Right Nutrient**
 - **Right Place**
 - **Right Time**
 - **Right Amount**

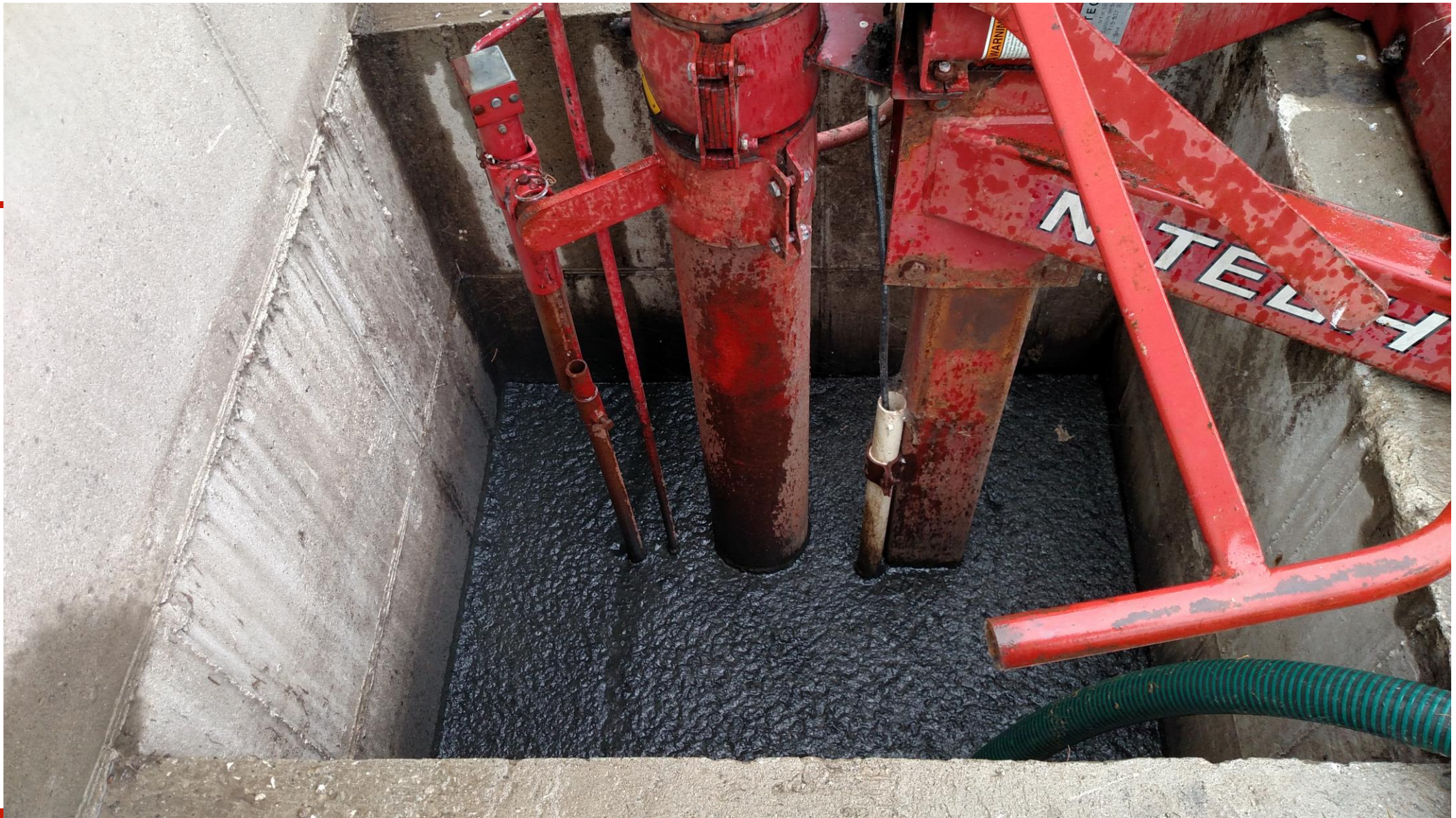
Applying this to manure nutrients



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Field Day Surveys of Manure Application in Western Ohio

January - March 3%

April – June 19%

July – September 29%

October – December 49%

- Over a billion gallons of swine manure and 2.5 billion gallons of dairy manure/wastewater is applied annually in Ohio

Field Day Surveys of Manure Application in Western Ohio Cont.

- Manure application windows dictated by growing crops
- Wheat acreage continues to decline
- Climate & laws dictating fewer days to apply manure
 - Need to open additional windows for manure application



2012-2016 OARDC Manure Sidedress Yields; bushels per acre

| PRE-EMERGENT TREATMENTS | 2012 | 2013 | 2014 | 2015 | 2016 | 5-Year Average |
|---------------------------------------|-------|-------|-------|-------|-------|----------------|
| Incorporated 28% UAN 200# | 111.5 | 184.6 | 145.1 | 130.8 | 140.9 | 142.6 |
| Incorporated swine manure 5,000 gal | 128.6 | 191.8 | 146.5 | 161.9 | 162.0 | 158.2 |
| Surface-applied swine manure | 109.5 | 175.7 | 137.2 | 110.3 | 125.5 | 131.6 |
| Inc. dairy manure +28% UAN 13,500 gal | 132.0 | 185.4 | 166.1 | 146.3 | 163.7 | 158.7 |
| Surface-applied dairy manure +28%UAN | 97.0 | 166.0 | 141.9 | 106.4 | 122.1 | 126.7 |
| POST-EMERGENT TREATMENTS | | | | | | |
| Incorporated 28% UAN | 116.0 | 181.9 | 140.9 | 140.1 | 145.1 | 144.8 |
| Incorporated swine manure | 138.4 | 196.7 | 139.9 | 158.5 | 183.7 | 163.4 |
| Surface-applied swine manure | 116.4 | 188.0 | 115.6 | 114.6 | 153.1 | 137.5 |
| Incorporated dairy manure +28%UAN | 138.8 | 192.0 | 156.9 | 167.5 | 167.7 | 164.6 |
| Surface-applied dairy manure +28%UAN | 101.6 | 181.5 | 125.3 | 111.6 | 156.1 | 135.2 |
| Zero nitrogen check | 62.6 | 82.0 | 67.0 | 40.2 | 48.7 | 60.1 |





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Four Years of On-Farm Swine Finishing Manure Drag Hose Plots (bu/acre)

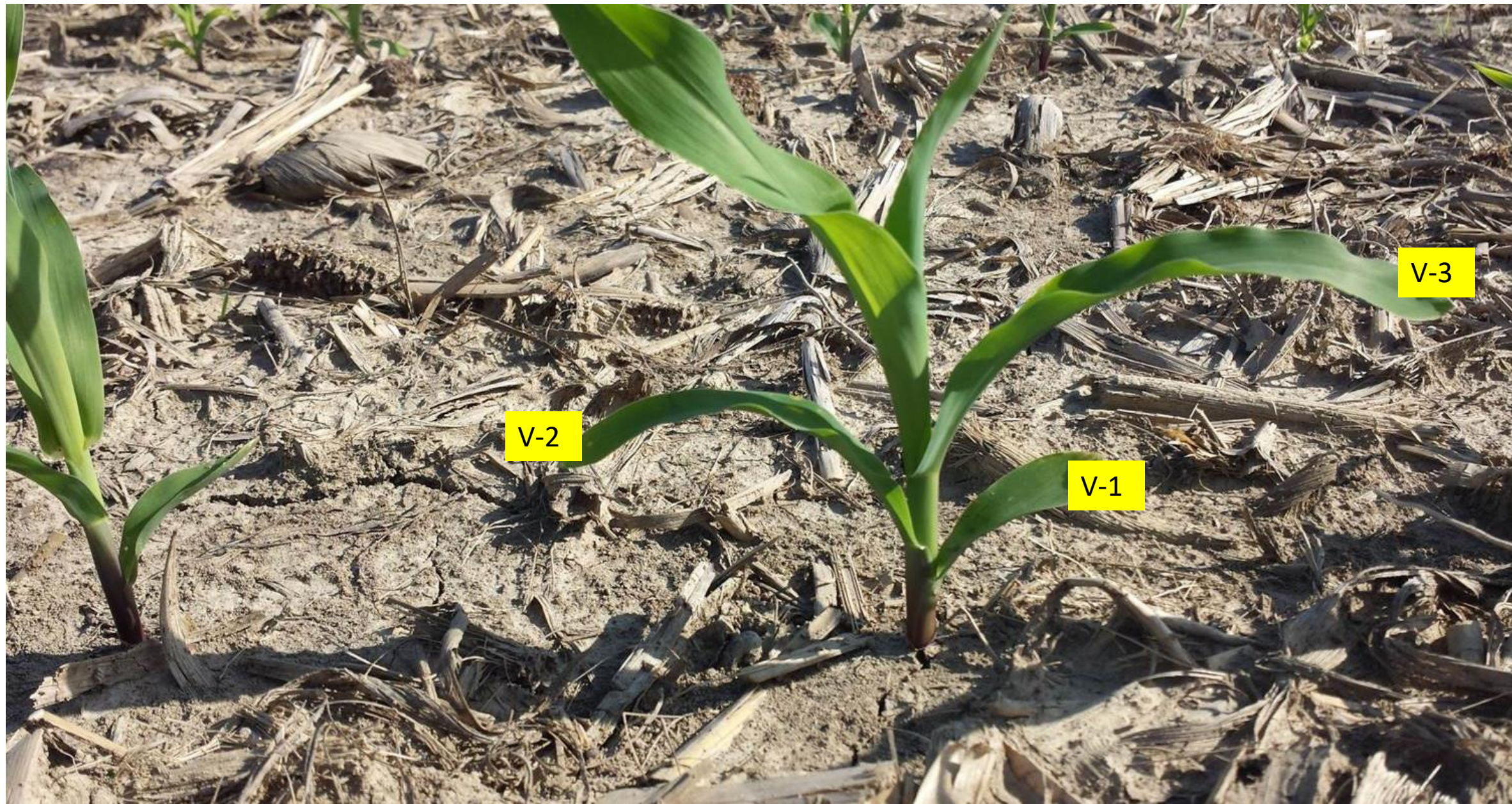
| Year | Swine Manure | 28%UAN |
|----------------|--------------|--------|
| 2017 | 165 | 145 |
| 2016 | 222 | 216 |
| 2015 | 154 | 121 |
| 2014 | 204 | 204 |
| 4-Year Average | 186.3 | 171.5 |

14.8 bu/acre difference

Save \$75/acre on N = 14.8 bu/acre @ \$3.40/bu = \$125.32/acre

Nutrient Balance of Manure Sidedress

| Crop | | P ₂ O ₅ | K ₂ O |
|-------------------|--------|-------------------------------|------------------|
| Corn | 200 bu | | |
| (.37) (.27) | | 74 lbs | 54 lbs |
| Soybeans | 60 bu | | |
| (.80) (.14) | | 48 lbs | 84 lbs |
| Removal | | 122 lbs | 138 lbs |
| 6,500 gal | Manure | 117 lbs | 143 lbs |
| Net Nutrient Gain | | -5 lbs | +6 lbs |



V-2

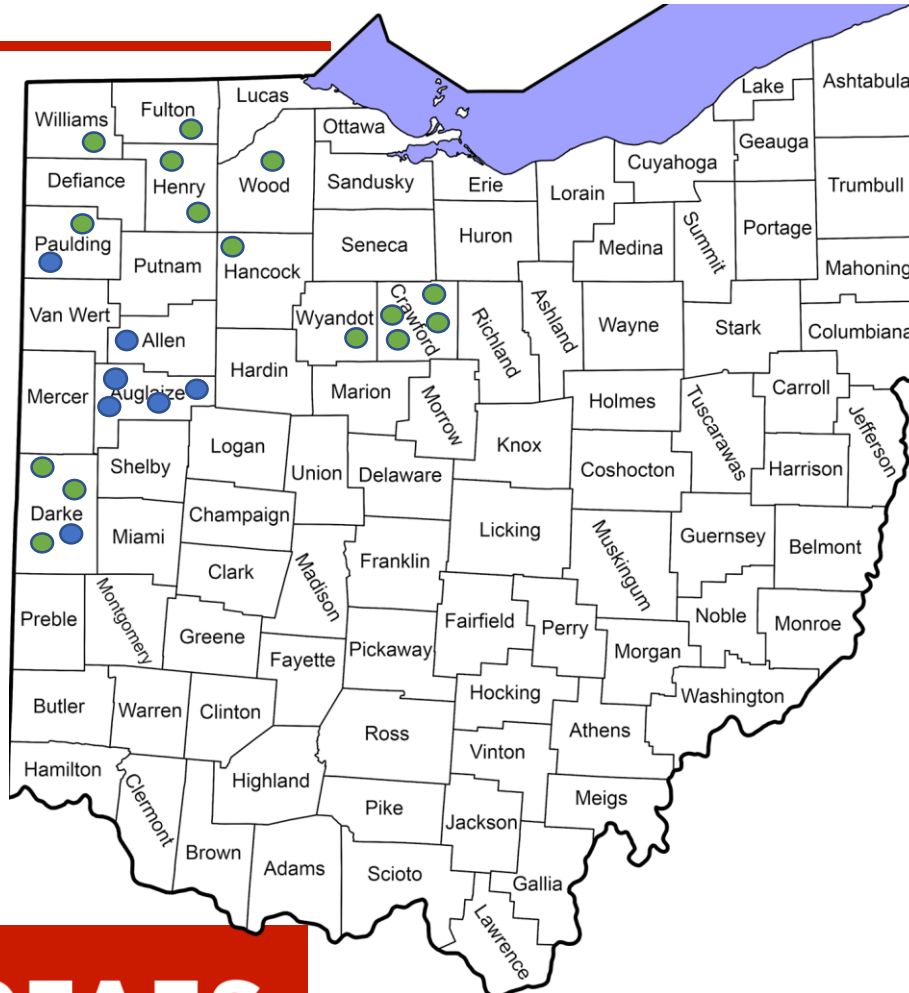
V-1

V-3









2018 Drag Hose Plots

- Completed Plots
- Unable to Complete Plots



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**Swine Finishing
Manure Applied just
Days after Wheat
Planting at 5,000
gal/acre**

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**12,000 gallons
per acre of
Dairy Manure
Applied prior to
Wheat Planting**



**Surface Applied
Urea**

**Incorporated
Manure**

A photograph of a large agricultural field filled with young corn plants. The plants are arranged in neat, parallel rows that stretch towards the horizon. The leaves are a vibrant green, and the soil between the rows is a light brown color. In the far distance, a line of trees and some buildings are visible under a clear sky. A semi-transparent light green rectangular box is centered over the middle of the image, containing the text "Thank You!" in a bold, black, sans-serif font.

Thank You!