INTRODUCTION
Nitrogen is expected to be 18% of total variable costs and over 8% of total costs for the 2017 corn crop in Ohio. Helping producers and educators identify the economic optimum nitrogen rate on their farms will not only help manage costs more closely but will prevent unnecessary nitrates from entering the water. This multi-year, multi-site corn nitrogen study will increase the confidence that this rate can be calculated more accurately.

OBJECTIVES
- Determine a corn yield response curve based on nitrogen rate.
- Identify an economic optimum rate based on a given corn price and nitrogen cost.
- Evaluate commercial nitrogen use efficiency at the economic optimum rate.
- Evaluate year end nitrogen levels with corn stalk nitrate tests.

RESULTS
- Rainfall is a determining factor in the amount of nitrogen that remains available for plant growth. Generally, yields were reduced in 2015 as a result of wet weather. Both 2014 and 2016 were more normal rainfall years but variable in rainfall timing (Graph 1). Average yield ranged from 90 bushels per acre (zero rate) to 192 bpa (300 lb/acre). See Graph 2. Thus indicated soil nitrogen can provide up to 90 bpa of yield.
- The economic optimum rate of nitrogen was the same at 200 and 225 lbs/acre of nitrogen. Net return to nitrogen was $556/acre at either rate (graph 2).
- At an economic optimum rate of 200 lbs N/acre and average yield of 185 bu/acre, the commercial nitrogen use efficiency (NUE) can be calculated to 1.08 units of nitrogen per bushel produced.

CONCLUSION
The data contained in this poster are based only on 13 sites over 3 years. Corn nitrogen rates are very elusive and as such, it is suggested that all producers conduct their own farm research to help determine the economic optimum nitrogen rate on their farm. Many nitrogen management tools already exist and more are being developed. Replicated on farm strip trials can help producers establish a baseline economic rate that can be adjusted annually.

REFERENCES

ACKNOWLEDGEMENTS
This project was generously supported by the Ohio Corn Marketing Program and the Dr. Culman Lab at OARDC. Special thanks to nine cooperating farmers and OSUE interns Troy Grime and Ben Eggers for assistance on this project.