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**Progress Report**

PROJECT TITLE: Farmable Vegetative Buffers

PROJECT NUMBER:

REPORTING PERIOD: November 1, 2018 – January 31, 2019

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1.) PROJECT ACTIVITIES COMPLETED DURING THE REPORTING PERIOD. (*Describe project progress specific to goals, objectives, and deliverables identified in the project workplan.*)

We submitted the following manuscript to *Agronomy* on Dec. 31: Kura Clover Living Mulch: Spring Management Effects on Nitrogen . Jonathan R. Alexander, Rodney T. Venterea, John M. Baker, and Jeffrey A. Coulter.

2.) IDENTIFY ANY SIGNIFICANT FINDINGS AND RESULTS OF THE PROJECT TO DATE.

In the 2017 growing season, we found that in 1st year corn following kura clover (corn planted into established kura clover using zone tillage), there was no response to added N, i.e. – no significant differences in yield across the range of applied N from 0 to 223 lb acre-1, with yields averaging approximately 200 bu acre-1. For second year corn in kura living mulch, yields were optimized at an N rate of 107 lb acre-1, well below U of M recommendations. Stover yields followed the same trends as grain yields. Residual soil N at the end of the season was consistent with these results, i.e. – at optimum N rates (0 for 1st year, 107 for 2nd year) there was very little residual N susceptible to off-season leaching.

In the 2018 growing season, we found no yield response to added N in either the first or second year corn in the kura living mulch system. Average yield across all plots was 213 bu/ac, slightly exceeding the station average of 210 bu/ac.

Findings from spring management study:

There were no significant differences in soil N enrichment from retaining or harvesting clover residue pre- row establishment, therefore, we conclude that a pre-plant forage harvest will not reduce N-credits from the living mulch.

Strip-tillage increased soil N enrichment by 144% over band herbicide kill row establishment.

Nitrous oxide emissions from managed KCLM were significantly higher than unmanaged clover at p<0.1, with >2 kg/ha from 3 of the 4 treatments over a 6 week sampling period.

3.) CHALLENGES ENCOUNTERED. (*Describe any challenges that you encountered related to project progress specific to goals, objectives, and deliverables identified in the project workplan.*)

We continue searching for a producer who will host a demonstration living mulch buffer.

4.) FINANCIAL INFORMATION (*Describe any budget challenges and provide specific reasons for deviations from the projected project spending.*)

Project remains on budget.

5.) EDUCATION AND OUTREACH ACTIVITES. *(Describe any conferences, workshops, field days, etc attended, number of contacts at each event, and/or publications developed to disseminate project results.)*

Alexander, J.R., J.M. Baker, R.T. Venterea, J.A. Coulter. 2018. Corn production in kura clover living mulch: Response to nitrogen fertilization. Minnesota Crop Prod. Retailers Trade Show, 11–13 Dec. 2018, Minneapolis, MN [poster].

Alexander, J., J. Coulter, J. Baker, and R. Venterea. 2018. Profitable conservation: Corn production in kura clover living mulch. In: Forage Focus, Dec. issue, Midwest Forage Assoc., St. Paul, MN. p. 18–19.

Alexander, J.R., J.M. Baker, R.T. Venterea, J.A. Coulter: Paper presented at American Society of Agronomy Meetings, Baltimore MD. *High Yielding Corn with Reduced Nitrogen Inputs: Production in Kura Clover Living Mulch*. November 5, 2018.

Roseville Area High School: Jonathan Alexander is leading an initiative for high school outreach by graduate students in the Land and Atmospheric Science program. A pilot presentation for 'LAAS in the Classroom' visited four Freshman-Senior science classes at Roseville Area High School on December 18, 2018. Over 100 students attended a lecture, titled, 'Measuring the Biophysical in an Open System'.