Farmer Rancher Grant Program

Final Report Form

Please fill out the final report form and post it on MySARE. If you do not have Internet access, return the form to the North Central Region-Sustainable Agriculture Research and Education (NCR-SARE) Missouri office. The report may be prepared on a computer or handwritten (please write or print clearly) but electronic reports are preferred. The final payment of your grant will be awarded when the final report and final budget report are received and approved.

Use as much space as needed to answer questions. You are not limited to the space on this form. The more details the better.

I. PROJECT IDENTIFICATION

- Name: Thomas E. Colonna
- Address: 9754 Highway Y
- City, State, Zip Code: Bowling Green, MO 63334

- Phone: 573-324-2693
- Website: www.OrganianFarms.com
- Project Title: Comparative Analysis of Unpasteurized Organic Milk vs. Organic Fish Emulsion and Kelp as an Organic Fertilizer for Livestock Forages
- Project Number: FNC12-852
- Project Duration: 2 years
- Date of Report: Nov. 25, 2014

II. PROJECT BACKGROUND

1. Briefly describe your operation (i.e. how many acres, what crops, types of cropping systems, type of livestock or dairy production, grazing systems, family operation, etc.)

Thomas E. Colonna and Desencia E. Thomas (husband and wife) own and operate Organian Farms LLC, a 115 acre farm located at 9754 Highway Y in Bowling Green, Missouri. This 115 acre farm is currently in transition for organic certification and has approximately 102 acres in hay production (fescue/red clover mixture). They currently have 30 Angus heifers rotationally grazed on approximately 80 acres of pasture. They also grow a few acres of fruits and vegetables.

2. Before receiving this grant, did you carry out any sustainable practices? If so, briefly describe what they were and how long you had been practicing them.

Certified organic fertilizer in Missouri is neither readily available nor inexpensive. As part of our organic transition plan we needed to haul thousands of gallons of certified organic fertilizer over 100 miles from the source to our farms in Bowling Green, MO. However, certified organic unpasteurized milk is available from several certified organic dairy farms and the milk is currently for sale at a fraction of the price paid for certified organic fish emulsion and kelp (Neptune's Harvest). We analyzed the use of unpasteurized milk as an organic fertilizer for growing livestock forages to provide useful information for organic farmers and establish the potential use of certified organic unpasteurized milk as an alternative fertilizer for organic.

III. PROJECT DESCRIPTION

This is the core of the report. Consider what questions your neighbors or other farmers or ranchers would ask about what you did with this grant. Describe how you planned and conducted your research or education activities to meet your project goals and discuss the results.

GOALS

List your project goal(s) as identified in your grant application.

We planned to analyze and compare unpasteurized organic milk and organic fish emulsion with kelp as an organic fertilizer for livestock forages.

PROCESS

Describe the steps involved in conducting the project and the logic behind the choices you made. Please be specific so that other farmers and ranchers can consider what would apply to their operations and gain from your experience.

We roto-tilled and drilled seed into 16 half-acre size test plots as follows:

Plot #	Forage
1	Certified Organic 4241 Creeping Alfalfa is pre-inoculated with OMRI approved INTX Pre-Vail inoculation
2	Certified Organic Red Star Red Clover
3	Certified Organic Kentaur 4N Perennial Ryegrass
4	Certified Organic Climax Timothy
5	Certified Organic Hairy Vetch
6	Certified Organic Pea-Outlage Mix
7	Certified Organic Kora Tall Fescue
8	Organic 4241 Creeping Alfalfa is pre-inoculated with OMRI approved INTX Pre-Vail inoculation and Certified Organic Red Star Red Clover MIXTURE
9	Certified Organic 4241 Creeping Alfalfa is pre-inoculated with OMRI approved INTX Pre-Vail inoculation
10	Certified Organic Red Star Red Clover
11	Certified Organic Kentaur 4N Perennial Ryegrass
12	Certified Organic Climax Timothy
13	Certified Organic Hairy Vetch
14	Certified Organic Pea-Oatlage Mix
15	Certified Organic Kora Tall Fescue
16	Organic 4241 Creeping Alfalfa is pre-inoculated with OMRI approved INTX Pre-Vail inoculation and Certified Organic Red Star Red Clover MIXTURE

Plots 1-8 were sprayed with unpasteurized organic milk diluted 3 parts milk with 17 parts water at an application rate of 20 gallons per acre. Plots 9-16 were sprayed with organic fish emulsion plus kelp (Neptune's Harvest) diluted 1:10 at an application rate of 20 gallons per acre.

Ten soil core samples were taken in a random fashion to a depth of 12 inches on each test plot and combined into single samples for each test plot to be analyzed by Perry Agricultural Lab (PO Box 418, State Hwy. 54 East, Bowling Green, MO) at times: just before initial fertilizer application; 12 months,

18 months, and 24 months after initial fertilizer application. We cut and baled the 16 half-acre size test plots - weighing the bales to determine total pounds of forage per acre. Plant tissue samples were taken at the vegetative stage for each forage test plot just before the first cutting each year. Feed analysis was performed by Perry Agricultural Labs in Bowling Green, MO on samples from each test plot after harvesting and baling. Milk fertilized, and fish emulsion fertilized soil samples were analyzed as set forth in the table below.

Plot #	Forage
1	Certified Organic 4241 Creeping Alfalfa is pre-inoculated with OMRI approved INTX Pre-Vail inoculation fertilized with unpasteurized organic milk
2	Certified Organic Red Star Red Clover fertilized with unpasteurized organic milk
3	Certified Organic Kentaur 4N Perennial Ryegrass fertilized with unpasteurized organic milk
4	Certified Organic Climax Timothy fertilized with unpasteurized organic milk
5	Certified Organic Hairy Vetch fertilized with unpasteurized organic milk
6	Certified Organic Pea-Outlage Mix fertilized with unpasteurized organic milk
7	Certified Organic Kora Tall Fescue fertilized with unpasteurized organic milk
8	Organic 4241 Creeping Alfalfa is pre-inoculated with OMRI approved INTX Pre-Vail inoculation and Certified Organic Red Star Red Clover MIXTURE fertilized with unpasteurized organic milk
9	Certified Organic 4241 Creeping Alfalfa is pre-inoculated with OMRI approved INTX Pre-Vail inoculation fertilized with organic fish emulsion plus kelp (Neptune's Harvest)
10	Certified Organic Red Star Red Clover fertilized with organic fish emulsion plus kelp (Neptune's Harvest)
11	Certified Organic Kentaur 4N Perennial Ryegrass fertilized with organic fish emulsion plus kelp (Neptune's Harvest)
12	Certified Organic Climax Timothy fertilized with organic fish emulsion plus kelp (Neptune's Harvest)
13	Certified Organic Hairy Vetch fertilized with organic fish emulsion plus kelp (Neptune's Harvest)
14	Certified Organic Pea-Oatlage Mix fertilized with organic fish emulsion plus kelp (Neptune's Harvest)
15	Certified Organic Kora Tall Fescue fertilized with organic fish emulsion plus kelp (Neptune's Harvest)
16	Organic 4241 Creeping Alfalfa is pre-inoculated with OMRI approved INTX Pre-Vail inoculation and Certified Organic Red Star Red Clover MIXTURE fertilized with organic fish emulsion plus kelp (Neptune's Harvest)

PEOPLE

List farmers, ranchers, or business people who assisted with the project and explain how they were involved. List any personnel from a public agency, such as the Extension Service, Natural Resources Conservation Services or Soil and Water Conservation Districts who assisted with this project. List people from non-profit organizations who helped you.

Thomas E. Colonna (Member/Manager, Organian Farms LLC)
Desencia E. Thomas (Member/Manager, Organian Farms LLC)
Gary Noel (USDA/NRCS Bowling Green, MO office)
Keith Jackson (USDA/NRCS Bowling Green, MO office)
Mike L. Adams (Farmer)
Mike L. Adams II (Farmer)
Stephen Jennings (Member/Manager, Jennings Agricultural Services LLC)

RESULTS

What results did you achieve and how were they measured? For production projects, include yields, field analysis, and related data. How do these compare with conventional systems used previously? For education projects, include outcomes achieved and how you measured them through surveys, attendance, or other methods. Were these results what you expected? If not, why not? What would you do differently next time?

It should be noted that the 115 acre farm purchased in the fall of 2009 was conventionally farmed for approximately 50 years – resulting in soils were severely nutrient depleted with average organic matter levels below one percent. After an extended drought in 2011 and 2012 (which caused us to delay planting the test plots until 2013) we had cool and wet summers in 2013 and 2014, which provided ideal conditions for the growth of cool season grasses. Overall, we saw little statistically significant difference between the unpasteurized organic milk vs. organic fish emulsion and kelp (Neptune's Harvest) as a fertilizer for livestock forage. The cooler and wetter conditions of the summers of 2013 and 2014 lead to far fewer crickets and more earthworms in the pastures and test plots than the drought plagued summers of 2011 and 2012. There was a higher level of soil calcium present in plots treated with unpasteurized organic milk. This is expected given the high level of calcium in milk. Forage protein levels were consistently higher in forage treated with unpasteurized organic milk. There is a trend toward higher soil potassium (K) levels in plots treated with unpasteurized organic milk and a trend toward higher soil phosphorous (P) levels in plots treated with Neptune's Harvest. We look forward to collecting more data in 2015 to see if we can identify any other trends and test the reproducibility of our initial test results.

Plot	Avg. Forage Yield lbs/acre	Avg. Forage Protein (%)	Avg. Soil Organic Matter (%)	Avg. Soil Total Nitrogen (ppm)	Avg. Soil (P) lbs/acre	Avg. Soil (K) lbs/acre	Avg. Soil pH	Avg. Soil CEC (me)	Avg. Soil Calcium lbs/acre
1 (Alfalfa - Milk)	2,272	20.12	1.10	14.83	9	72	6.3	11.44	3,375
2 (Clover - Milk)	1,128	18.90	1.90	16.40	9	133	6.5	14.63	4,673
3 (Ryegrass - Milk)	2,376	9.93	2.00	10.07	6	112	6.7	12.47	4,413
4 (Timothy - Milk)	2,918	8.76	1.70	14.23	12	112	6.5	13.10	4,251
5 (Vetch - Milk)	1,222	19.86	1.60	16.23	9	114	6.6	11.51	3,960
6 (Pea/Oat – Milk)	1,240	20.18	1.90	14.10	9	119	6.4	14.72	4,436
7 (Fescue – Milk)	1,594	7.73	1.70	14.11	15	132	6.3	14.91	4,467
8 (Alfalfa/Clover – Milk)	2,750	18.25	1.40	13.47	9	92	6.7	10.67	3,809
9 (Alfalfa – N.H.)	864	15.54	1.80	16.00	19	127	6.2	14.36	4,234
10 (Clover – N.H.)	1,686	22.14	2.10	13.38	6	105	6.8	11.96	4,296
11 (Ryegrass – N.H.)	2,432	11.08	2.00	12.19	12	102	6.7	11.20	3,935
12 (Timothy – N.H.)	2,588	5.06	1.20	15.13	9	59	6.7	8.62	3,091
13 (Vetch – N.H.)	1,882	18.00	1.60	14.33	19	99	6.2	11.94	3,459
14 (Pea/Oat – N.H.)	2,352	12.10	1.60	11.12	19	95	7.1	11.26	4,017
15 (Fescue – N.H.)	2,504	6.34	1.20	10.30	15	89	6.2	11.98	3,288
16 (Alfalfa/Clover – N.H.)	3,516	15.62	1.10	10.81	38	84	6.7	10.52	3,666

DISCUSSION

What did you learn from this grant? How has this affected your farm or ranch operation? Did you

overcome your identified barrier, and if so, how? What are the advantages and disadvantages of implementing a project such as yours? If asked for more information or a recommendation concerning what you examined in this project, what would you tell other farmers or ranchers?

We plan to collect more data and look for statistically significant trends in our comparison between Unpasteurized Organic Milk vs. Organic Fish Emulsion and Kelp (Neptune's Harvest) as an Organic Fertilizer for Livestock Forages. We plan to continue the test plots for at least five years to generate sufficient data to support long term conclusions and see how reproducible results are under a variety of growing conditions (our preliminary results in 2011 and 2012 suggested some benefits of unpasteurized organic milk during drought conditions that were not seen under ideal cool season grass growing conditions in 2013 and 2014).

IV. PROJECT IMPACTS

Evaluate the economic, environmental and social impacts of this sustainable practice by completing the Benefits and Impacts form. Also, if possible, provide hard economic data.

If we can demonstrate long term similar results between the unpasteurized organic milk vs. organic fish emulsion and kelp (Neptune's Harvest) as a fertilizer for livestock forage there could be substantial savings for organic farmers located long distances from the coastlines of the U.S.

V. OUTREACH

What methods did you use for telling others about: 1. Your project, 2. Project events or activities, 3. Project results? How and to whom did you communicate this information? Be sure to include details on how many people attended field days or demonstrations, and how information was further disseminated by media covering any events. What plans do you have for further communicating your results? Include press releases, news clippings, flyers, brochures, or publications developed during this project. Also include photos which might be helpful in telling your story to others. (Mail items separately if you cannot send them electronically.)

We spoke on several occasions with Gary Noel and Keith Jackson (both at USDA/NRCS Bowling Green, MO office) about this project. We eventually plan to post results on our website (www.OrganianFarms.com) and to submit articles for publication, as well as, to present results at future Organian Farm Field Days.

VI. PROGRAM EVALUATION

The North Central Region SARE Program first sponsored a farmer rancher grant program in 1992. As a participant, do you have any recommendations to the regional Administrative Council about this program? Is there anything you would like to see changed? Please fill out the Evaluation form.

VII. BUDGET SUMMARY

Complete the final budget form and return it with your report. You will only be reimbursed for expenses incurred and items purchased for conducting your project. If you made significant changes to final expenses listed by budget category ($1,000 or more), please include an explanation for the changes. Call Joan Benjamin with questions at: 573-681-5545.

Submit your final report to:

E-mail: BenjaminJ@lincolnu.edu or mail to:

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