Learning From On-Farm Research: PFI’s Cooperators’ Program

Bruce Carney – Carney Family Farms
Tom Frantzen – Frantzen Farm
Meghan Filbert – Livestock Coordinator, Practical Farmers of Iowa

Jan. 20, 2018
MISSION:
Equipping farmers to build resilient farms and communities.
Cooperators’ Program

Since 1987...

PFI’s vehicle for conducting on-farm research on the issues and concerns deemed most important by our members.

Goal: Make sure practical and farmer-directed on-farm research is conducted and shared with other farmers in Iowa, the Midwest and beyond.
Since 1987...

230 cooperators have conducted...

1,259 on-farm trials
Cooperators’ Meeting

• Annual, 2-day meeting in December.
• By invitation only.
• Very much a *working* meeting for those attending.

1. Reporting
2. Knowledge gaps & project ideas
3. Project design
1. Farmer-researchers present on past year’s findings.
2. Identify knowledge gaps & new projects
3. Project design
4. Implement new trials on-farm
5 (1. again). Farmer-researchers present on past year’s findings.
In 2017...

51 cooperators took part in...

71 on-farm trials
Project Locations, 2017
Can rolling covers provide better weed control and reduce costs in my soybeans?
This trial encouraged us to experiment with varieties we hadn’t used before, and we had success. These varieties filled a void in our CSA and market offerings.
What is the cost of feeding different forages throughout the winter?

How can we meet our goal of only feeding hay one month out of the year?
Underseeded vs. Mid-Summer-Seeded Green Manure Cover Crops—
Vic Madsen, Doug Alert, Margaret Smith

Which will provide more N to the succeeding corn crop?
Grazing Cover Crops in Cow-Calf Operations – Wesley Degner, Bill Frederick, Mark Schleisman

“When cattle are out grazing covers, we don’t have to feed cows, which can save us money.”
This project helped me think through how I want to use the sheep on my vegetable fields and what will be most feasible.
Research Reports

Read and download reports of novel on-farm research projects designed and led by farmers in field crops, horticulture, livestock, energy and more.

Reports encompass a range of topics in field crops, grazing and livestock, horticulture, on-farm energy and local food. Data from Cooperators’ Program projects is analyzed by Practical Farmers staff trained in agronomic research methods. Research reports are written by Practical Farmers staff to ensure consistency and quality, and are available for free in hard copy or online.

Title  Date  Member Priorities

Alternative Free Choice Minerals for Goats  12/10/15
Enterprise Budget for Cucumbers  12/09/15
Apple Cider Vinegar Supplementation in Feeder Pigs  12/08/15
Bell Pepper Variety Trial – Olympus and ...
Grazing Cover Crops for Winter Feed, 2015 Update  12/07/15
Corn Following Green Manure Cover Crops ...
Summer Squash Following Winter Rye With Strip ...
Timing of Nitrogen Supply to Corn from Spring ...
Oat Variety and Fungicide Trials  11/30/15
Cereal Rye Cover Crop Termination Date Ahead of ...
On-farm researchers...

- Are curious about observations made on the farm
- Have questions about production practices
- Set project designs and parameters
- Collect and record data
- Share findings with other farmers
- **Generate new questions & experiments!**
How to get involved...

Stefan Gailans, field crops
stefan@practicalfarmers.org

Liz Kolbe, horticulture
liz@practicalfarmers.org

Meghan Filbert, livestock
meghan@practicalfarmers.org

515-232-5661
## Trials

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Year</th>
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<tbody>
<tr>
<td>Comparison of Stocker Gains from Grazing Different Forages</td>
<td>2009</td>
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<tr>
<td>Soil Quality Indicators Among Different Farming Systems</td>
<td>2010</td>
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<tr>
<td>Comparison of Steady State Water Infiltration Rates Among Farming Systems</td>
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<tr>
<td>Monitoring Winter Cattle Diets</td>
<td>2011</td>
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<tr>
<td>Grazing Cover Crops on Corn Ground</td>
<td>2014</td>
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<tr>
<td>Improving Cool-Season Pastures with Interseeding Annuals and Grazing</td>
<td>2014-2016</td>
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<td>Tile Water Monitoring</td>
<td>2015-2016</td>
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<tr>
<td>Demonstrating Economic and Soil Health Benefits of Grazing Cover Crops</td>
<td>2015-2018</td>
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<tr>
<td>Pasture Management and Carcass Quality</td>
<td>2015-2018</td>
</tr>
<tr>
<td>Monitoring Birds in Rotationally Grazed Pasture</td>
<td>2016-2017</td>
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</tbody>
</table>
Monitoring Birds in Rotationally Grazed Pasture

Staff Contact:
Meghan Filbert - (515) 232-5661
meghan@practicalfarmers.org

Cooperators:
* Bruce Carney - Maxwell

Student Researchers:
* Grace Baumgartner - Drake University
* Corwin Willis - Drake University

Funding By:
The National Fish and Wildlife Foundation

Web Link:

In a Nutshell
* Wild bird populations can thrive in properly managed working landscapes.
* Cattle activity changes grassland structure: creating areas with short and tall vegetation, which provides habitat that is less available in conservation areas.
* For some species, rotationally grazed pastures have the capacity to support greater bird population sizes compared to conservation areas that are not grazed.
* Prairies and pastures complement one another to protect a wider range of birds than either habitat alone.

Key findings
* Rotationally grazed perennial pasture
### Table 1

**Bird Species Ranked From Most Abundant to Least Abundant in 2016**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Species</th>
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<th>Species</th>
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<tr>
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<td>Field Sparrow</td>
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<td>22</td>
<td>Ring-Necked Pheasant</td>
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<td>Broad-Winged Hawk</td>
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<td>3</td>
<td>Dickcissel</td>
<td>23</td>
<td>Turkey Vulture</td>
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<td>Red-Winged Blackbird</td>
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<td>Rock Pigeon</td>
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<td>5</td>
<td>European Starling</td>
<td>25</td>
<td>Warbling Vireo</td>
<td>45</td>
<td>Great Blue Heron</td>
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<td>American Crow</td>
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<td>8</td>
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<td>Gray Partridge</td>
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<td>9</td>
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<td>Northern Flicker</td>
<td>50</td>
<td>Fox Sparrow</td>
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<td>11</td>
<td>Common Yellowthroat</td>
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<td>Rusty Blackbird</td>
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<td>Great-Crested Flycatcher</td>
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<td>Common Grackle</td>
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<td>Mourning Dove</td>
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<td>14</td>
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<td>House Finch</td>
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<td>House Sparrow</td>
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<td>16</td>
<td>Northern Mockingbird</td>
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<td>18</td>
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<td>Lincoln's Sparrow</td>
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<td>19</td>
<td>American Robin</td>
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<td>American Kestral</td>
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<td>Red-Tailed Hawk</td>
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<td>20</td>
<td>Henslow's Sparrow</td>
<td>40</td>
<td>Vesper Sparrow</td>
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Species of special interest in this study listed in bold.

### Table 2

**Bird Species Ranked From Most Abundant to Least Abundant in 2017**

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<td>Eastern Kingbird</td>
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<td>Rose-Breasted Grosbeak</td>
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<td>13</td>
<td>Canada Goose</td>
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<td>Nelson's Sparrow</td>
<td>48</td>
<td>Orchard Oriole</td>
</tr>
</tbody>
</table>

Species of special interest in this study listed in bold.
Figure 1. Number of different bird species observed in each habitat type each year. By habitat, columns labeled with different letters are significantly different. At $P < 0.10$, the Restored Prairie had significantly more diverse species than the year prior and the Perennial + Annual Pasture had significantly less diverse species than the year prior.
Figure 2. Total number of all bird species observed in each habitat type reported on a log scale. For each habitat type, columns labeled with different letters are significantly different. At $P < 0.05$, more birds were observed in the Perennial Pasture and Perennial + Annual Pasture than Restored Prairie, both years.
Figures 3 and 4. 2016 and 2017 average bird abundance, for the five species of conservation interest, in A. restored prairie, B. perennial pasture, C. perennial + annual pasture. Cattle grazing periods in the pastures are designated by horizontal black lines.
Bird Monitoring

Key findings
• Rotationally grazed perennial pasture supported 553 birds (22 species) in 2016 and 468 birds (23 species) in 2017.
• Rotationally grazed perennial + annual pasture supported 524 birds (28 species) and supported 545 birds (21 species) in 2017.
• Pastures better supported some birds that are considered in decline than the restored prairie.

Project Timeline:
May 2016 - September 2016
May 2017 - September 2017

“I learned that you don’t have to have thousands of acres to conserve wildlife. At first, I assumed Chichaqua would have more birds than my farm, but it really comes down to management. Smaller parcels of land, managed properly, can create favorable habitats and support birds.” – Bruce Carney

• Prairies and pastures complement one another to protect a larger population of birds then either habitat alone
• Agriculture and conservation can co-exist
Objective:

• To demonstrate ways to integrate multiple species of cover crops and cattle grazing into a corn and soybean enterprises

• To quantify soil health benefits and long-term economic value of those benefits to the crop/grazing system.
Methods

• Plant diverse cover crop mix
  *red clover - hairy vetch - cereal rye - spring barley - mustard - turnip*

• Contract graze neighbor’s crop field
  *keep grazing records*

• Soil health tests in control & treatment fields

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
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<tr>
<td>Treatment</td>
<td>844.26</td>
<td>1434.67</td>
<td>900.36</td>
</tr>
<tr>
<td>Control</td>
<td>988.92</td>
<td>899.28</td>
<td>418.59</td>
</tr>
</tbody>
</table>

**PLFA**
Fall & Spring Grazing

Fall Grazing:
Nov. 9 - 18: 55 finishers
Dec. 4 - 12: with 53 feeders
Dec. 17 – 24: with 53 feeders

Spring Grazing:
Apr. 3 - Apr. 10: 100 cow-calf pairs & heifers
Apr. 22 - Apr. 29: 120 cow-calf pairs
Apr. 12 - May 7: 50 feeders & 150 cow-calf pairs
Value of Cover Crop Forage

• 2015-2016 = $1,535 @ $80/ton
  = $3,185 @ $100/ton

• 2016-2017 = $2,921 @ $80/ton
  = $6,061 @ $100/ton
What I’ve learned

• Make your cover crop as important as your cash crop
• Use shorter season hybrids
• Use the right chemicals for grazing
• Plant cover crops earlier
• Location of crop field from cows - need sacrifice area?
• Water/fence/insurance
• Multispecies cover crop vs. single species
• Use winter kill cover crop if you don’t graze in spring
• Full season cover crop – add grazing for a full year
SOIL HEALTH PRINCIPLES

1. Keep the soil covered
2. Minimize soil disturbance
3. Increase crop diversity
4. Keep living roots in the soil
5. Integrate livestock

www.nrcs.usda.gov
Benefits of Animal Impact on Row Crop Fields

- Recycle nutrients for next cash crop
- Not removing nutrients; 90% deposited back
- More readily available form
- Help with residue breakdown in cold weather
- Add biology; microbes & bacteria
- Break up capping
- Help with water infiltration
- Deposit manure where it’s needed
- Potential to increase crop yields
- Turbo charge soil health = higher land values
- Organic matter
Frantzen Farm
New Hampton, IA
PRACTICAL
FARMERS
OF IOWA
ON-FARM
RESEARCH
What are we trying to achieve?

• OUR GOAL IS TO IDENTIFY AND HOPEFULLY ADDRESS BARRIERS TO THE VIABILITY OF NICHE MARKET PORK PRODUCTION.
Apple Cider Vinegar Supplementation in Feeder Pigs

In a Nutshell

- Apple cider vinegar has been long advocated for its health benefits and is gaining recognition as a health supplement for livestock.
- Apple cider vinegar is held to being a health tonic that promotes beneficial gut bacteria, improves digestion of feedstuffs, enhances performance, and helps decrease parasite load.
- Tom Frantzen supplemented three groups of pigs with apple cider vinegar and measured feed intake, average daily gain, feed efficiency and return over feed costs compared to pigs not supplemented.

Key findings:

- Pigs supplemented with apple cider vinegar were observed to have a cleaner, more improved vascity and body composition.
APPLE CIDER VINEGAR...

5 GALLONS PER TON
Figure 2. Average daily gains for each rep as well as the means for pigs fed apple cider vinegar (ACV) and those not (No ACV). For the mean, columns with same letters are not significantly different at $P \leq 0.05$. The least significant difference (LSD) is indicated above the mean column.

Figure 4. Carcass yields for each rep as well as for pigs fed apple cider vinegar (ACV) and those not (No ACV). For the mean, columns with same letters are not significantly different at $P \leq 0.05$. The least significant difference (LSD) is indicated above the mean column.
ACV pigs netted $12.87 more per head than No ACV pigs.

**Table 3**
Costs and profits incurred from pigs supplemented with apple cider vinegar (ACV) and those that were not supplemented with apple cider vinegar (no ACV).

<table>
<thead>
<tr>
<th></th>
<th>Rep 1</th>
<th>Rep 2</th>
<th>Rep 3</th>
<th>Mean</th>
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</thead>
<tbody>
<tr>
<td>Treatment</td>
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<td>No ACV</td>
<td>ACV</td>
<td>No ACV</td>
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<tr>
<td>Carcass price ($/lb)</td>
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<td>$2.00</td>
<td>$2.00</td>
<td>$2.00</td>
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<tr>
<td>Carcass weight (lb/hd)</td>
<td>173.00</td>
<td>177.40</td>
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<tr>
<td>Carcass value ($/hd)</td>
<td>$346.00</td>
<td>$354.80</td>
<td>$358.14</td>
<td>$311.98</td>
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<tr>
<td>Total feed intake (lb/hd)</td>
<td>637</td>
<td>741</td>
<td>679</td>
<td>607</td>
</tr>
<tr>
<td>Total feed costs ($/hd)</td>
<td>$168.17</td>
<td>$184.51</td>
<td>$179.26</td>
<td>$151.14</td>
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<tr>
<td>Net returns ($/hd)</td>
<td>$177.83</td>
<td>$170.29</td>
<td>$178.88</td>
<td>$160.84</td>
</tr>
</tbody>
</table>
Apple Cider Vinegar

“Every time we sorted pigs, I could see a difference in size and could pull out vinegar pigs right away from their looks.” - Irene Frantzen

“The results indicate that ACV improves pig performance and this is something that merits further investigation, by other farmers and by industry.” - Tom Frantzen

“After feeding ACV in three repetitions, I saw improved pig vitality. Vinegar pigs were more vigorous.” - Tom Frantzen

Key findings:

- Pigs supplemented with apple cider vinegar were observed to have a sleeker coat, improved vitality and looked healthier than those not receiving apple cider vinegar.

- Pigs supplemented with apple cider vinegar tended towards increased feed intake and average daily gains, higher carcass yields, better feed efficiency, and higher profits.

Project Timeline:
September 2014 – November 2015
Pelleted Small Grains Fed to Pigs

Objective: To measure if feed efficiency of a small grain (high-fiber) based diet increases when pelleted.

Project Period
April – August 2017; from weaning to finish.
Methods

• Split litters into two groups, take weights monthly
• Color code ear tags identify each pig!

• Feed one group mash and one group pellets

• Keep records of ration composition, nutritional analysis and costs

• Collect carcass information
SPLIT FEEDER

WHEN WE DO REPLICATED TRIALS
WE ROTATE THE ‘TREATED’ SIDE TO
EVEN OUT “BACKGROUND NOISE”.

PFI PURCHASED A SCALE

WITH THIS SCALE WE CAN OBSERVE THE INDIVIDUAL PERFORMANCE OF THE EAR TAGGED PIGS IN THE FEEDING TRIAL.
PFI TRIAL – WEIGHING & RECORDING
WE GENERATE INDIVIDUAL ANIMAL PERFORMANCE WITH PERIODIC WEIGHING.
FEED SAMPLES ARE ANALYZED.
HIGH FIBER DIETS ARE RESEARCHED.
Results

Round 1 Average Daily Gains:
- Mash – 1.54
- Pellets – 1.53

Round 2 Average Daily Gains:
- Mash – 1.51
- Pellets – 1.55
Next Steps...
2018 AND 2019 RESEARCH

• FOCUS #1: REPLACING SOME OF THE CORN IN GROW FINISH DIETS WITH HYBRID RYE. THREE ROUNDS OF COMPARISONS.

• FOCUS #2: COMPARING THE EFFECT OF HIGH TEMPERATURE PELLETING OF THE RYE REPLACEMENT DIET TO NOT PELLETED.