Speaker Instructions
Proceedings & Presentations

December 12-14, 2023 | Nugget Casino Resort | Sparks, NV

Audience

Producers/farm managers are 50-70 percent of the audience, with the balance being pest control advisors, researchers, and representatives from agencies, universities, and industry. Given this composition, it is suggested that you orient your discussion towards a more practical (rather than to a more technical) audience.

Deadlines

- **August 1:** Review Program and submit any changes *(presentation title, name, affiliation, location).* The most recent Program can be found online at calhaysymposium.com/2023-symposium-program.
- **August 1:** Submit Bio and Headshot.
- **August 1:** Submit presentation description for CCA & PCA CEU application.
- **August 1:** Register for Symposium
  - *Registration is complimentary; however, we still ask that you register for our records.*
- **November 23:** Make hotel reservations through the Symposium hotel block at https://calhaysymposium.com/hotel-venue/.
- **December 1:** Submit UCANR Release Form.
  - *UC staff do not need to submit this form.*
- **December 1:** Submit Proceedings.
- Please email all requested items to nicole@agamsi.com.

Presentation

- Please review the program for your presentation date and time allotted.
  - Please plan to leave five minutes for Q&A in your presentation time.
- Bring a flash drive with your PowerPoint presentation to the tech table **before** your session begins.
- **PowerPoint File Name:** <Session #>-<Speaker #>< Speaker-lastname>.
  - Ex: Session 2, Speaker 3, Dhillon
  - *This will help the AV tech pull up the correct presentation in the correct order.*

Proceedings

- **Publishing:** Your Proceedings will be available immediately after the Symposium online. If you do not wish to write proceedings, but would like to publish your PowerPoint, please let nicole@agamsi.com know. Please refer to the UC Davis website at: https://alfalfa.ucdavis.edu/+symposium/2018/index.aspx to see previous years' proceedings.
- **Submission:** Submit your Proceedings as a Microsoft Word document by **December 1st**; **do not send it as a PDF.**
- **File Name:** Please name your Proceedings <EVENT-ACRONYM>-<Speaker-lastname>-<TitleWithoutSpaces>.
  - Ex: WAFS-Dhillon-ProceedingsTitleExample

Proceedings Paper Format

- Please refer to the attached Proceedings example.
- **Include:** Title, authors, institutions, and addresses (footnote), a brief abstract, keywords, as well as text, tables, figures, and references as needed.
- **Paper & Margins:** Manuscript should be formatted as 8 ½" x 11", with all margins (top, bottom, and sides) equal to one inch (1") on all pages. Exceptions: if tables or figures require slightly more space – move to the right of the page.
- **Title, Names & Footnotes:** Paper title in 12 pt. **BOLD, ALL CAPS**. Names of presenters in 12 pt. **Bold**, both upper and lower (title) case. Title, names, and addresses should be footnoted.
- **Important: Provide Citation in Footnote at Bottom of First Page**. Place a footnote on the first page with name, email, and institution and publisher (font size 9). Example as follows: George G. Haymaker (ghaymaker@gmail.com) and Ricky Raker (rraker@alfalfaguy.org), Department of Hay Sciences, Haymaking University, Cubing City, CA. 95729. **In**: Proceedings, 2019 Western Alfalfa and Forage Symposium, Reno, NV, Nov 19-21. UC Cooperative Extension, Plant Sciences Department, University of California, Davis, CA 95616. (See http://alfalfa.ucdavis.edu for this and other alfalfa conference Proceedings.)
- **Text Font:** Times New Roman 12 pt. or a similar font (see sample page), except for footnote (9 pt.). Single space text, double space between paragraphs, no indents.
- **Headings & Subheadings:** Headings of sections (e.g. **INTRODUCTION**) should be in all caps, bold, with a space between headings. Sub-headings should be in **Bold, Italic**. Both headings and subheadings should be in 12 pt. font.
- **Figures, Tables, Photos, Illustrations:** Please place your figures, tables, photos, or illustrations in the document exactly the way you would like them to appear. Figure and table numbering should correspond to references in the text. Some authors choose to place the figures within the text, while others place them at the end. Figures, tables, and illustrations must be embedded in the file ready for printing.
- **Length:** Although there are no restrictions on length, recommend 4 pages or less. One-to-two-page well-written proceedings papers are acceptable. Keep proceedings to less than 10 pages.
- **DO NOT** include page numbers on the copy you submit. We will add these.

Questions/Assistance

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RECYCLING AND MANAGEMENT OF MANURE IN FORAGE CROPS

[1]Eric Young and [2]Jessica Sherman

ABSTRACT

Modern dairy production relies on capturing nutrient and production efficiencies for the animal and cropping sides of the business to optimize profitability. Manure management is an increasingly important economic and environmental aspect of dairy production. While manure nutrient content/speciation and total solids content can vary widely among farms and over time for individual farms, manure is a critical source of crop nutrients and soil organic carbon (SOC), underpinning long-term soil quality/health. Managing a range of semi-solid and liquid manures is common on larger dairy farms. Technology for handling, transporting, and incorporating manure has quickly evolved and encompasses a large range of field application equipment and tillage combinations. While broadcast/surface application of manure is still common in hay crop and annual cropping systems, incorporating manure with some type of tillage captures more nitrogen and often reduces nutrient runoff risk. However, tillage itself can also be counterproductive in some situations, particularly in coarser-textured soils with low organic matter content, where greater water holding capacity and SOC are required for improved crop growth. Low disturbance manure application (LDMI) can incorporate manure (via injection or enhancing manure infiltration) while reducing soil disturbance compared to tillage incorporation (chisel, disk/harrow). Shallow disk injection and -banding are two LDMI methods that use liquid manure and can be used during both corn and hay crop production. Research at the USDA-ARS indicates that shallow disk injection conserved more N for fall-applied manure in a corn-silage winter rye cover crop system and maintained more surface residue compared to tillage. Additional experiments also indicated a relatively low risk of yield reduction for shallow disk injection and aeration-banding application methods in hay crop and corn silage fields. LDMI methods therefore show promise for improving nutrient use efficiency and utilizing more on-farm nutrients, however longer-term research at multiple locations is needed to better evaluate possible impacts of LDMI on forage yield and quality.

Key words: Dairy manure, soil fertility, nitrogen, phosphorus, tillage, soil health

INTRODUCTION

Manure management is an important aspect of modern dairy production, influencing agronomic, economic, and environmental facets of the business. Liquid manure (<15% solids content) storages are common on larger dairies, however proper handling of semi-solid manures (>15%

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In: Proceedings, 2021 Western Alfalfa & Forage Symposium, Reno, NV 16-18 November 2021. (http://alfalfa.ucdavis.edu).

solids) from dry cows, heifers, and manure separation systems is also important. Several considerations should be evaluated in trying to optimize manure application benefits on forage crops including crop species, stage of development, nutrient content/forms in the manure, application rates, soil test nutrient levels, environmental risks, soil moisture status, weather conditions, and critically, the method and timing of applications.

Nutrient content of manures varies widely mainly due to variation in forages and feedstuffs used in dairy rations. Manure nutrient testing and spreader rate calibration are essential for determining accurate estimates of nutrient inputs from manure and determining field-by-field inorganic fertilizer needs, which has important farm economic impacts.

Broadcast/Surface Applied Manure

Broadcast application/surface application of manure in annual and perennial forage crop systems is commonly done on farms. While this is not ideal with respect to nutrient use efficiency and runoff potential, some farms may not have the necessary equipment to incorporate manure or have other reasons for not wanting to incorporate using primary or secondary tillage (no-till systems). Incorporating manure with tillage tools is an effective way to conserve nitrogen (N) and other nutrients while reducing loss potential associated with runoff and leaching, however tillage increases erosion potential and can increase nutrient and sediment loss in runoff.

Low Disturbance Manure Application

Low disturbance manure incorporation (LDMI) methods attempt to strike a balance between soil disturbance from tillage and increasing the extent of manure-soil interaction to reduce nutrient loss potential. Field research at the USDA-ARS indicates that both shallow disk injection and aeration-banding tools can substantially decrease ammonia-N loss, in addition to reducing dissolved and particulate phosphorus (P) and N loss in surface runoff compared to broadcast or banding alone (Sherman et al., 2020ab; Sherman et al., 2021ab).

LDMI can be used in both hay crop and corn production systems without necessarily compromising crop yield. A three-year ARS trial conducted in at the Marshfield Agricultural Research Station in central Wisconsin showed that shallow disk injection conserved more N when fall-applied in a corn silage system compared to other LDMI methods and spring applied fertilizer N. Moreover, there were few significant differences in soil N among manure application methods at the end of the season (Sherman et al., 2020b). Research conducted at other ARS laboratories and university trials also indicate greater overall soil N and P retention when manure is incorporated with tillage or LDMI methods.

In other LDMI experiments conducted in alfalfa-grass plots at the same location, results showed that shallow disk injection significantly reduced dissolved P losses in runoff (after simulated rainfall events). Compared to other treatments, LDMI plots also tended to maintain greater surface residue coverage, indicating lower overall soil disturbance and potential plant damage. While our results have indicated few differences in alfalfa dry matter yields among broadcast and LDMI methods, more research is needed to more accurately account for the cost-effectiveness of

LDMI in hay and annual cropping systems and their potential impacts on forage quality compared to more traditional approaches.

CONCLUSIONS

Manure management will continue to be a critically important aspect of sustainable dairy production in the US. Research conducted at multiple USDA-ARS locations and that done by other institutions indicate that LDMI can offer benefits of lower soil disturbance and decreased N and P loss potential, but in general requires more time and specialized equipment.

As with any new field practice, site-specific field limitations and environmental risk considerations in relation to manure application equipment availability and goals should be evaluated to help determine if LDMI is a fit for a given farm. In summary, LDMI methods show promise for conserving more nutrients in dairy systems, but more research is needed to better assess forage yield and quality effects compared to broadcast and more traditional tillage incorporation methods, in addition to drag hose and other viable techniques.

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