

Turkey Compost vs. Commercial Fertilizer: Three-Year Effects on Irrigated Pasture Production in Southern Utah

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SITUATION

Cow-calf production accounts for 75% of agricultural revenue in Garfield County, Utah, where producers manage several thousand acres of irrigated pasture. Rising fertilizer prices have led producers to explore alternative nutrient sources such as turkey compost produced by regional poultry operations. However, limited local research exists comparing turkey compost with commercial fertilizers in high-elevation pasture systems. This study evaluates pasture productivity and economic feasibility of turkey compost compared to commercial fertilizer applications.

OBJECTIVES

1. Compare pasture production among fertilizer treatments:
 - Urea
 - Urea + ammonium sulfate
 - Turkey compost
2. Evaluate economic feasibility of fertilizer treatments.
3. Determine if residual nutrient release from turkey compost improves long-term productivity.

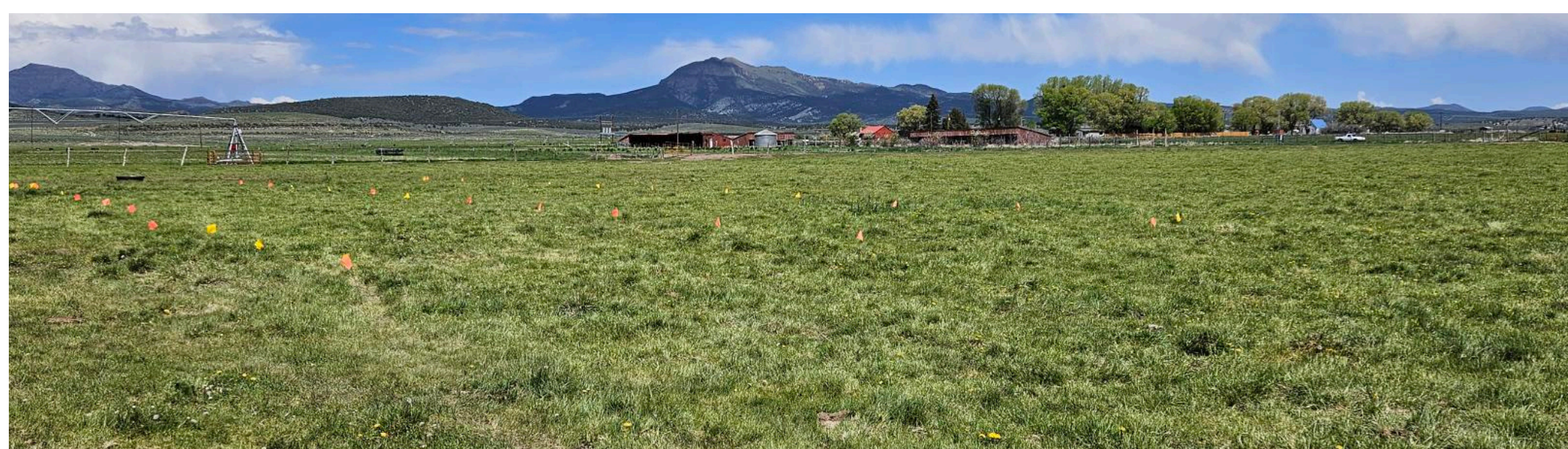


Figure 1: Grazed pasture of cool season grasses and clover in Panguitch, Utah on June 1, 2023

METHODS

Location:

USU Panguitch Agricultural Experiment Station (6,600 ft elevation) (Figure 1)

Design:

Randomized complete block design with 4 replications

Treatments:

- Control
- Urea
- Urea + ammonium sulfate
- Turkey compost

Application:

- Commercial fertilizer applied annually (2023–2025)
- Turkey compost applied once in 2023

Fertilization rate:

90 lb N/acre

10 lb S/acre provided with Urea+Ammonium Sulfate

Forage samples:

- Collected every 28–31 days
- Air-dried and converted to dry matter per acre

RESULTS

Forage Production (lb DM/acre)

As indicated in Figure 2, all fertilizer treatments significantly increased pasture production compared to the control ($p < 0.05$).

Turkey compost increased pasture production:

- 50% in year two
- 21% in year three
- Commercial fertilizer produced the highest immediate yields
- Turkey compost provided strong residual productivity

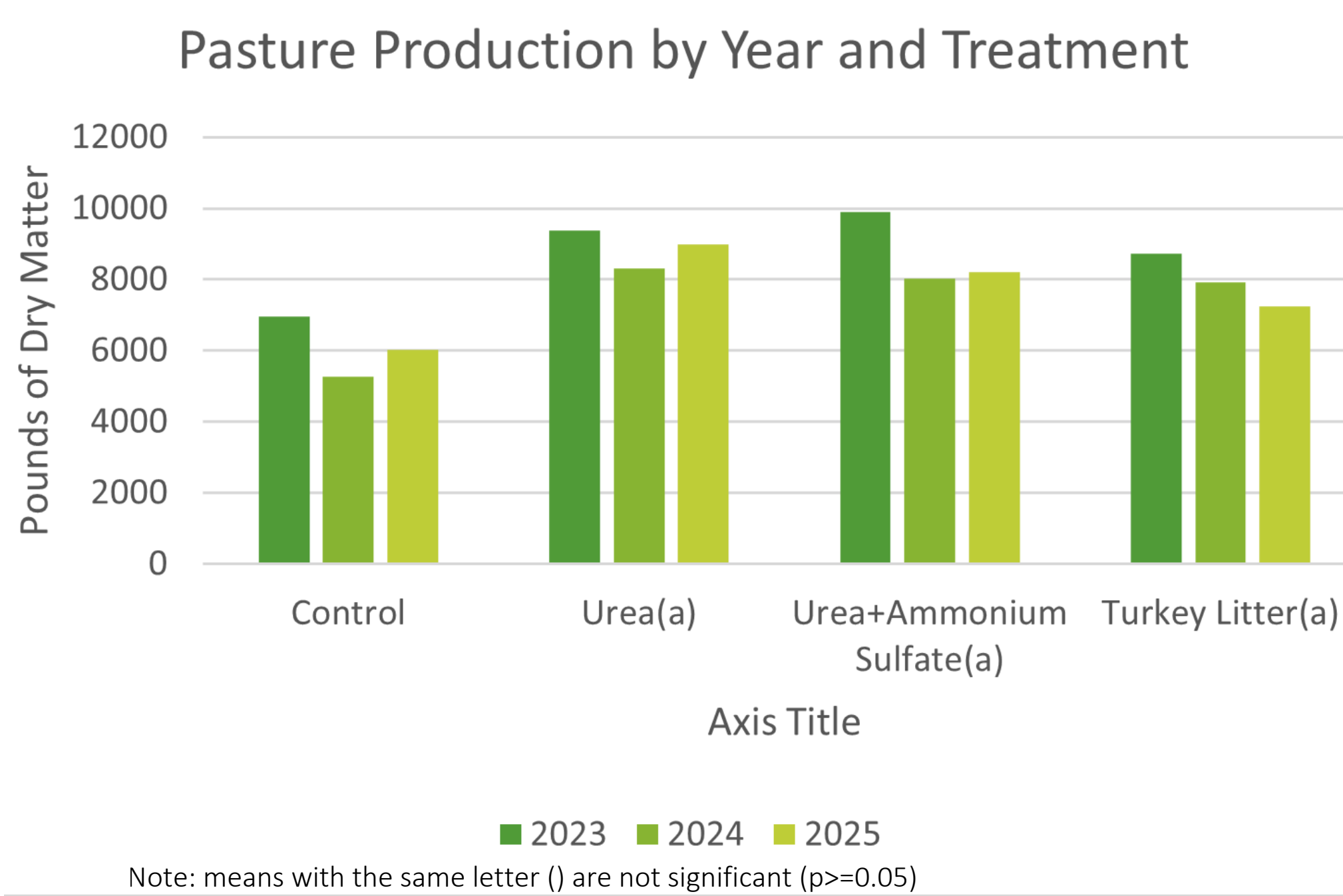


Figure 2: Three-year average forage production by fertilizer treatment.

Economic Analysis

In Figure 3, break-even grazing days calculated using \$19 per AUM pasture value and fertilizer costs at 2023 market prices (initial treatment year).

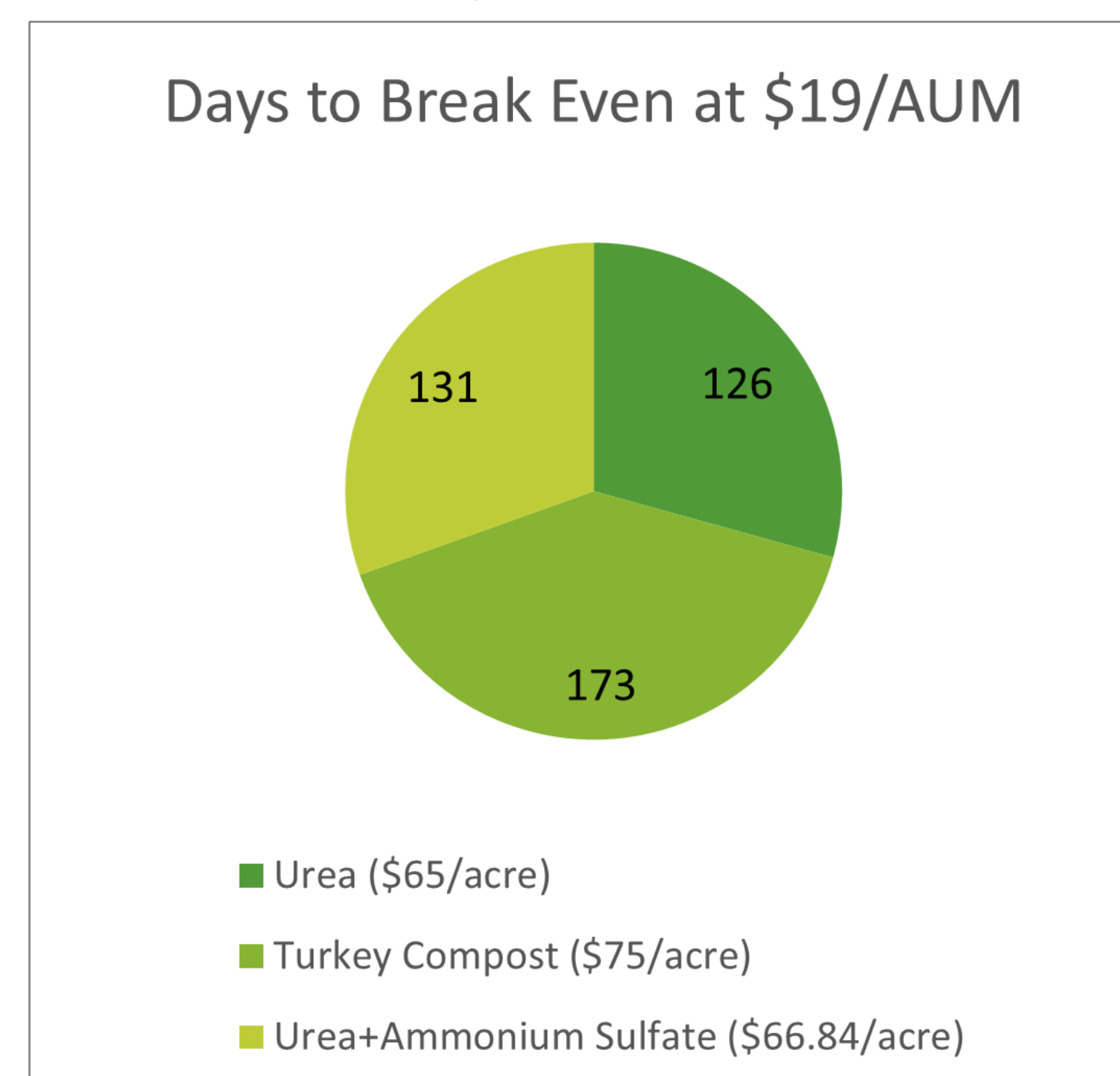


Figure 3: Grazing days for each fertilizer treatment to break even in cost

- High-elevation irrigated pastures in southern Utah average ~150 grazing days annually.
- Commercial fertilizers recovered costs within a typical grazing season.
- Turkey compost would not be economically viable if applied annually, as break-even exceeds the grazing season.
- Because compost was applied once in 2023 and increased production in years two and three, less frequent applications may improve long-term economic feasibility.

IMPACTS

A single turkey compost application increased irrigated pasture production for three years, suggesting less frequent applications may improve fertilizer efficiency and profitability.

- Fertilization significantly increased pasture production, with all treatments producing greater yields than the unfertilized control ($p < 0.05$).
- Turkey compost applied once in 2023 increased production 50% in year two and 21% in year three, demonstrating strong residual fertility.
- This response is consistent with research showing poultry litter nutrients release gradually, with ~50% nitrogen available the first year, 15% the second, and 6% the third year (Zhang et al., 2017).



Figure 4: Field days were held in 2024 and 2025.

- Annual turkey compost application would cost approximately \$150,000 to fertilize 2,000 acres (\$75/acre) in Panguitch Valley and would not recover costs within the typical 150-day grazing season.
- Results indicate turkey compost may be more economical when applied every three years, compared to commercial fertilizers requiring annual application.
- Field days in 2024 and 2025 (Figure 4) helped producers ($n=62$) evaluate fertilizer strategies, supporting informed decisions to maximize pasture productivity and profitability.

REFERENCES

Zhang, H., Hamilton, D.W., and J. Payne. 2017. *Using Poultry Litter as Fertilizer*. Oklahoma State University Extension. Id: PSS-2246. <https://extension.okstate.edu/fact-sheets/using-poultry-litter-as-fertilizer.html>



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