

Meeting Wheat Nutrient Needs with LysteGro Fertilizer in Northern California

Since 2017, University of California Cooperative Extension has been working on field trials to evaluate the effectiveness of LysteGro relative to commercial fertilizer for wheat production in Solano County, California.

WHAT IS LYSTEGRO?

Lystek utilizes a patented thermal hydrolysis process Lystek THP® to transform biosolids and other organics into LysteGro® a Class A quality, pathogen-free high-quality concentrated liquid fertilizer. LysteGro, a fertilizer with the California Department of Food and Agriculture (CDFA), contains valuable concentrations of Nitrogen (N), Phosphorus (P), and Potassium (K) (approximately 45, 45, and 35 lbs/1,000 US gallons, as total N, P₂O₅, and K₂O, respectively). LysteGro also contains a variety of other micro and macronutrients (Calcium, Magnesium, Sulfur, Iron, and Zinc), as well as organic matter.



Figure 1. LysteGro Trial Application

THE TRIAL

The project evaluated two years of wheat yields by comparing a synthetic nitrogen treatment and different rates of LysteGro in Northern California. In 2018, the trial took place at a dryland site in the Montezuma Hills of Solano County on upland soils. The common practice of this grower is a three-year rotation of wheat, safflower, and fallowing. The treatments in 2018 were: LysteGro at 1,750 and 2,750 US gallons/acre (equivalent to approximately 61 lbs and 96 lbs plant available N/acre), anhydrous ammonia at 90 lbs N/ac and an untreated control.

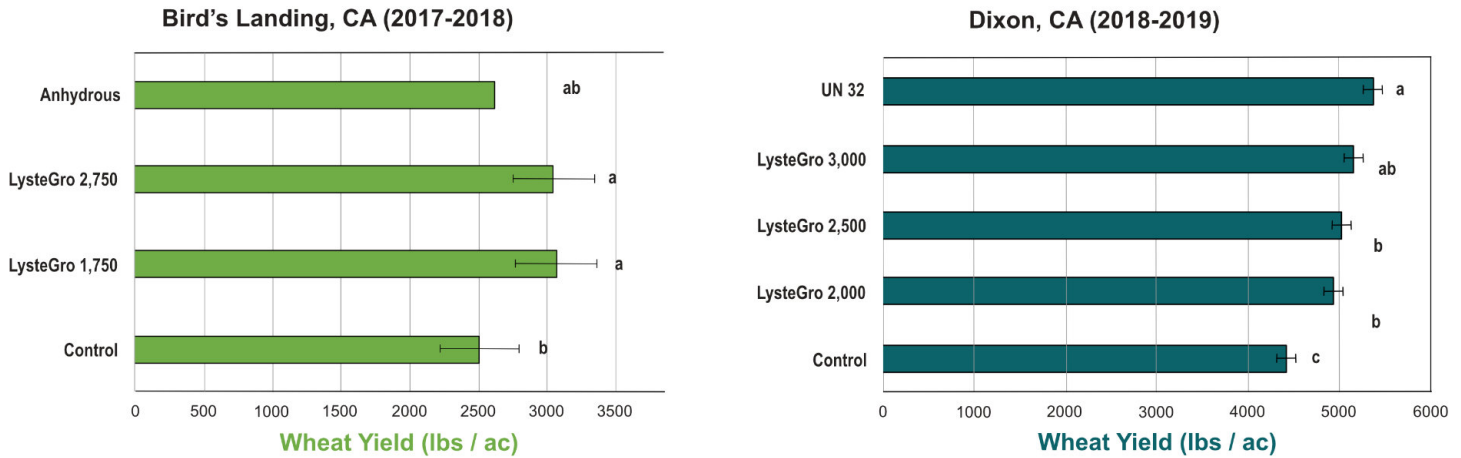
In 2019, the trial site was located on irrigated ground on valley soils near Dixon, California. This grower has a three-year rotation of wheat, safflower, and tomatoes. The treatments in 2019 were: LysteGro at 2,000, 2,500 and 3,000 US gallons/ac (70, 88, 105 lbs plant available N/acre¹), UAN at 120 lbs N/acre and an untreated control. All treatments were applied prior to seed planting with no in-season top-dress. Yield was measured at harvest on an area basis and then converted to lbs/acre. Mean yields were then calculated for each treatment from the individual plot yields.

¹Plant-available nitrogen is based on 40% mineralization rate.

RESULTS

In the 2018 harvest, wheat yields were significantly higher in the LysteGro treatments than in the control, which received only starter fertilizer. Mean yields of LysteGro treatments trended higher but were not significantly different from the anhydrous treatment. The anhydrous treatment was not significantly different from the control

Figure 2. Wheat yield in 2018 harvest (left) and in 2019 harvest (right). Bars represent estimated marginal means of replicates (accounting for block effects). Error bars represent standard error (2017-2018 n=3, 2018-2019 n=4). Significant differences between treatments are indicated by different letters.



In 2019, the yield for the highest application rate of LysteGro (3,000 US Gallons/ac) was similar to the UN treatment. All LysteGro treatments and the fertilizer treatment had significantly higher yields than the untreated control. Yields trended higher with increasing application rates of LysteGro but were not significantly different among those rates.

DISCUSSION AND CONCLUSIONS

Overall, LysteGro proved to be similar in its performance relative to synthetic fertilizers applied at similar rates of available lbs N/acre, in wheat. In both years, yields in LysteGro plots were higher than the untreated control and comparable to synthetic fertilizer treatments.

In 2018, the two LysteGro rates had similar yields, indicating that at that site, a lower application rate of 1,750 US gallons/acre was sufficient in that year (likely due to the fact that water was limiting). In periods of extreme drought stress (as seen in the 2017-2018 season), the small amount of extra water added to the soil at depth by the injection process may have given individuals a slight advantage relative to other fertilizer treatments. This dynamic may explain why LysteGro treatments were significantly different from the control, and the anhydrous treatment was not.

In 2019, rainfall was well above average, and there was a yield response that trended higher to increasing application rates of LysteGro. The 3rd year trial, 2019-2020, suffered from severe drought stress on non-irrigated ground. Soil data was recovered, which will contribute to overall understanding of the mineralization behavior of these types of biosolids, but yields were not collected.

Lystek will continue to participate in the annual biosolids wheat trials in Solano County run by UCCE. There are additional benefits of applying LysteGro, such as providing micronutrients and organic matter to build soil biology and improve soil physical properties over time. Additional results will be included as they become available.

ACKNOWLEDGMENTS

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If you have any questions related to the trial or the product, or you wish to see the full report for this project, please contact:

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Month	2017- 2018	2018- 2019	2019- 2020
Dec.	-	1.89	7.3
Jan.	1.5	2.43	1.01
Feb.	0.27	8.99	0.01
Mar.	1.84	4.80	0.79

Table 1. Winter Monthly Rain Total, Solano County (inches)



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