



## TwinN on Industrial Hemp Fiber in Central Kansas, USA, 2023.

### INTRODUCTION

The trial was conducted by Performance Crop Research, a Kansas-based independent contract research company. The trial was designed to test the capacity of TwinN microbial biofertilizer to enable increased yields and reduced nitrogen fertiliser applications in industrial hemp (*Cannabis sativa* cv Yuma) production.

### SUMMARY

A single application of TwinN produced substantial increases in yield (~70% increases even with a 20% reduced N application rate) while two applications of TwinN more than doubled yields. These large effects on yield, combined with reduced nitrogen fertiliser costs, resulted in large increases in returns per acre.

### MATERIALS & METHODS:

The irrigated field is located in Stafford County near Great Bend, Kansas, USA. The soil type is Saltcreek and Naron fine sandy loam. The experiment was conducted as a randomized complete block design with 4 replications. The treated plot size was 6 ft by 40 ft (240 ft<sup>2</sup>). The row spacing was 7.5 inches. The field data were subjected to analysis of variance and treatment means were separated at p=0.05%

### TREATMENTS

Treatments consisted of standard 100% nitrogen fertiliser rate versus one or two TwinN applications combined with either 80% or 100% nitrogen rates. Other nutrients were kept at standard rates across all treatments.

The crop was planted April 28 2023 and harvested October 18 2023.

Date	April 28 2023	June 1 2023	June 21 2023
Standard N program (100% N)	17.5 lbN/ac (Urea)	35 lbN/ac (UAN)	35 lbN/ac (UAN)
Reduced N program (80% N)	Nil	35 lbN/ac (UAN)	35 lbN/ac (UAN)

## TwinN applications

TwinN was applied via boom spray in 20 gal/ac (180L/ha) followed by 0.3 inches irrigation water via centre pivot. The first application was made 23 days post-emergence (May 31 2023, V6 stage, 16 inches high) and in treatments receiving two TwinN applications the second application was made 36 days after the first application (July 6 2023, 6 ft high).

## RESULTS

The Control treatment which received 87.5 lb N/ac (100kg N/ha) through the season produced 5 T/ac which is an average to good yield for the district. A single application of TwinN combined with either 80% or 100% of the standard N rate produced a large yield increase with the 80%N plus TwinN yielding 72% higher than the non-TwinN control. The 80% N and 100% N plus two TwinN applications produced very large yield increases with the 80% N plus two TwinN applications producing a massive 134% yield increase.

Table 1 Average harvested wet biomass for five treatments (US Tons)

Treatment	Yield (T/ac)
1. Control. (100% N Fertilizer) No TwinN	5.0 c
2. 1x Twin N (100% N Fertilizer)	8.2 b
3. 1x Twin N (80% N Fertilizer)	8.6 b (+72%)
4. 2x Twin N (100% N Fertilizer)	11.0 a
5. 2x Twin N (80% N Fertilizer)	11.7 a (+134%)

Yield is average harvested biomass from four replicate plots/treatment  
Means followed by same letter or symbol do not significantly differ (P=0.05).

## CONCLUSION

One or two applications of TwinN reduced nitrogen fertiliser requirements and costs while boosting hemp biomass yields and returns very significantly.



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