

# Optimizing Industrial Hemp Production 2017



## Site 1: CBD Research (Sustane® 3-7-4)

### Purpose

To demonstrate the value of Sustane products on industrial hemp for outdoor CBD production and to establish optimal rates of application.

### Collaborators

Farmer collaborators for this project were Kirstin Bohnert from United Hemp Industries and Daniel Plyler, both licensed participants in the Kentucky Hemp Pilot Program.

### Methods

Site 1 was an old pasture that was deficient in phosphorus. Test results showed that soil at this site was nutrient poor and acidic, most likely a result of horses pastured there in previous years. Because soil pH was lower than what is optimal for hemp (pH < 6.5) all plots received 1 T/A of lime. Sustane® 3-7-4 was selected for the plot trial, to be applied at the rates of 50 Lbs. (low) and 100 Lbs. (high) per plot.



***Kirstin Bohnert with United Hemp Industries measures plants at nine weeks (7/26/17)***

The experiment was laid out in a random block design with multiple blocks of three different treatments; untreated check, low (50 Lbs./plot), and high (100 Lbs./plot). Sustane® 3-7-4 was applied in early May, prior to the plastic mulch and drip tape being laid. The plants were planted on May 24th, 2017, and the harvest was completed on September 26th, 2017. Throughout the season, plots were monitored and weeded according to grower practice.

Fresh weight yield data was collected the day before the harvest was complete, September 25th, 2017. Ten plants from each plot were pulled, weighed, and labeled before they were hung to dry. These plants were kept to dry separate from the others, and their dry weight yield data was collected on November 21st, 2017 in the same manner.

## Results

Despite suboptimal growing conditions, Sustâne Natural Fertilizers produced extraordinary results. Sustâne 3-7-4 applications were selected to increase SOM and porosity, as well as provide sufficient nutrition in the otherwise P-deficient soils.

Treatment	# N / A applied	FW Yield lbs. / plot	DW Yield lbs. / A	Gross \$ / A	Fertilizer ROI
UNC	0	54 b	408 b	\$12,240	n/a
374low	80	77 ab	564 ab	\$16,420	5.2
374high	160	101 a	738 a	\$22,140	5.6

Specifically, FW and DW yields increased with increasing rate, indicating that soil fertility was a primary limiting factor at this site. The highest rates of Sustâne were able to provide the greatest gross return to the grower, nearly double the unfertilized test plots.

Low density planting (1200 vs 2000 plants per acre) reduced yield potential, but was necessary for research purposes. Heavy rains and suboptimal soil moisture conditions may have further limited yields. Overall, it was a successful project.



*Plot #3 High Application at four weeks (6/21/17)*



*Plot #3 High Application at nine weeks (7/26/17)*

For more information on this project, contact [help@Sustâne.com](mailto:help@Sustâne.com), Brian Gardener at [briang@Sustâne.com](mailto:briang@Sustâne.com), or Kirstin Bohnert at [UnitedHempIndustries@gmail.com](mailto:UnitedHempIndustries@gmail.com).

## Site 2: Seed/Fiber Research (Sustâne® 8-2-4)

### Purpose

To demonstrate the value of Sustâne products for industrial hemp seed and fiber production, and to establish optimal rates of application.

### Collaborators

Farmer collaborators for this project were; Kirstin Bohnert from United Hemp Industries and Diane Young at Farmington Historic Plantation, both licensed participants in the Kentucky Hemp Pilot Program.

### Methods

Site 2 was well maintained park land soil with reasonably well-balanced soil fertility.

Soil test results showed that the plot was in reasonably good condition, with good fertility, and a slightly low pH. Sustâne® 8-2-4 was selected for the plot trial, to be applied at the rates of 17 Lbs. (low) and 33 Lbs. (high) **per plot**.

The experiment was laid out in a random block design with multiple blocks of three different treatments; untreated check, low (17 Lbs./**plot**), and high (33 Lbs./**plot**). Sustâne® 8-2-4 was applied in early May, prior to planting. The hemp was planted on June 10th, 2017 and harvested on October 6th, 2017. Throughout the season, plots were monitored and weeded according to grower practice.

Fresh weight yield data was collected on the same day as harvest. From each plot, a square meter was selected and harvested. The plants were counted, and the seed heads were cut off. Data was collected from both the seed heads and stalks separately. Following Data collection, the harvested material was left to rett for a few weeks. Dry weight yield data was collected from the retted stalks on November 21st, 2017 in the same manner.



*Kirstin Bohnert with United Hemp Industries applies Sustâne® 8-2-4 nutrient blend to research site (6/4/17)*



*Plot #6 High Application at six weeks (7/26/17)*



*Plot #1 Low Application at nine weeks (8/30/17)*



## Results

Sustâne 8-2-4 was used for this project because it provides hemp nutrients in proportions ideal for its growth. Increasing rates of Sustâne produced significantly higher initial stands and shoot growth. However, by midseason the height differences were minimal.

Treatment	# N / A applied	Initial Stand #/sq ft	Shoot Height1 cm	Shoot Height2 cm	Final Stand #/sq ft
UNC	0	8.8 b	63 b	233	2.3 b
824low	80	11.3 ab	66 b	241	2.9 a
824high	160	15.3 a	79 a	244	2.1 b

By harvest time, the hemp had self-thinned to about 100,000 plants per acre. Stands were significantly higher where the low rate of Sustâne had been applied, even though the caliper of the stalks were thicker in the plots receiving the higher rate (data not shown).

At harvest, hemp plots receiving Sustâne 8-2-4 produced significantly higher yields than the untreated control plots. Hemp receiving the low rate of Sustâne had marginally higher stalk yields but marginally lower seed yields than the high rate plots. While both rates were profitable for the grower, the ROI was notably greater for the low rate at this site.

Treatment	# N / A	DW Stalk lbs. / A	Seed Yield lbs. / A	Gross \$ / A	Fertilizer ROI
UNC	0	2125 b	670 b	\$2,448	n/a
824low	80	4280 a	1161 ab	\$4,781	2.9
824high	160	3430 ab	1313 a	\$4,137	0.4

Because this site could be credited about 60 lbs. of N based on native SOM credits, it can be expected that optimum hemp production in KY requires between 140 and 180 lbs. of N per acre.

*\* Near the end of the season, this crop was hit hard by Hurricane Harvey traveling North from Texas. This resulted in lodging in a few of the plots. Fortunately, even with the damage, the plot was harvestable and data collection was not affected.*

For more information on this project, contact [help@Sustâne.com](mailto:help@Sustâne.com), Brian Gardener at [briang@Sustâne.com](mailto:briang@Sustâne.com), or Kirstin Bohnert at [UnitedHempIndustries@gmail.com](mailto:UnitedHempIndustries@gmail.com).