



# Hemp Fertility Demo 2016

## Purpose

Demonstrate the value of Sustâne organic fertilizer products in greenhouse and field grown industrial hemp production.

## Methods

Two Sustâne products were tested as sources of supplemental fertility on an organically managed hemp farm in Kentucky during the summer of 2016.



**Figure 1: Cooperator Jason Marshall, a licensed industrial hemp grower in Cynthiana, Kentucky.**

For the field trial, a side dress of 8-2-4 (white flags) was applied as a full rate side dress (1 cup/plant = 800 lbs. /A = 56 lbs. N/A) (Figure 2). The Sustâne treatment (white flags) was compared to the same rate of Nature Safe 10-2-8 (green flags), and untreated (red flags) plots of the same size in a replicated block design. The field was planted to CBD-producing female clones of hemp the last weekend of May. The field was flagged and treated two weeks later. A soil sample was taken at the time of trial set up to assess baseline fertility across the test plots.

Crop assessments included stand and plant height five weeks after side dress application (mid-July), and shoot fresh weight two weeks prior to field harvest (mid-September). Stand survival was assessed along two separate 50 foot transects of each plot and are reported on a percentage basis. Plant heights were measured on eight consecutive plants from each transect. Shoot biomass fresh weight was assessed in each plot using whole plants (n=6) cut at the soil line and weighed in the field. Yields were calculated on a

per acre basis assuming 2400 plants per acre. Notes on field topology, weed intensity, and color of plants were also taken in the plots during times of data collection.

For the greenhouse trial, Sustâne 4-6-4 was added as a full rate top dress (2 cup/20 gallon = 6 lbs. /CY) to the potting mix and compared to Fox Farms potting mix alone. The plants were watered regularly and examined for top growth four weeks later.

## Results

### *Industrial Hemp Field trial*

The soil test showed that the field had generally good pH (6.6) and organic matter (2.6%) levels. Nitrogen was to be supplied by previous cover crops and soil organic matter (a 60 lbs. N per A credit) and side dress fertility applications (50 – 60 lbs. N per A). Soil nitrate was measured at 16 ppm at the time of side dressing. Soil P was quite high (72 ppm) and K was sufficient (125 ppm). Other nutrients were in a less than ideal balance with Ca, S, and Fe being present at high levels while Zn, Cu, and B were all at low levels. The soil data indicated that addition of balanced fertility with a compost based fertilizer pre-plant and after transplanting would likely support additional crop growth.



**Figure 2: Hemp transplants receiving a side dress application of organic Sustâne 8-2-4 two weeks after transplanting.**

The field had been previously used for tobacco production but placed in organic pasture for three

years prior to hemp production. The gently sloping field had a clay loam soil and the bottom edge of the field is prone to excessive moisture, conditions less than ideal for hemp growth. Heavy rains sometimes caused field saturation and loss of whole plants to blight at low moderate throughout the field (Figure 3).



**Figure 3: Hemp plants six weeks after transplanting, at time of stand assessments. One block of untreated (left), Nature Safe treated (center), and Sustane treated (right) plots are shown. Note the higher rate of plant kill in rows treated with Nature Safe.**

Overall, growing conditions were warmer and drier than usual and the grower opted to supplement some portions of adjoining fields with Sustane-based compost tea (data not shown).

**Side dress applications of Sustane 8-2-4 increased transplant growth, survival, and biomass production relative to the other test treatments (Table 1).** Most notably, plants receiving the Nature Safe treatment were both less vigorous and more prone to blight which reduced plant stand significantly. While not significant, biomass production was measured to be 810 lbs. / acre greater in the Sustane treated plots as compared to the untreated check, indicating that the fertility was only partially limiting.

Product	Height (in)	Stand (%)	Fresh Wt. (lbs.)	Biomass (lbs./acre)
Sustane	19.2 A	91 A	5.8	12690 A
Nature Safe	16.9 B	70 B	5.0	8259 B
None	19.1 A	88 A	5.7	11880 A

**Table 1: Average responses of industrial hemp to side dress fertility treatments. Values followed by different letters are significantly different (P<0.15).**

If one assumes CBD oil represented just 3% of the biomass harvested, **the Sustane side dress application**

**would still provided the grower \$2000 more per acre above the cost of application.** These data demonstrate the value that Sustane 8-2-4 can provide to industrial hemp growers.

#### *Industrial Hemp Greenhouse Trial*

Application of 4-6-4 significantly improved vegetative growth of plants grown in pots (Figure 4). **While flowering date was unaffected, the overall shoot size and flower volume were approximately 50% greater in the Sustane treated pots.** These data demonstrate the benefit of supplementing premium potting mixes with Sustane for greenhouse grown industrial hemp.



**Figure 4: Plants grown in Fox Farms potting mix treated with Sustane (left) or left untreated (right) four weeks after transplanting.**

Follow up research is planned with this cooperator. In addition to a repeat of the field trial, the grower will examine how Sustane's compost tea might most profitably be used to further enhance hemp crop productivity.



For more information on this project, contact us at [help@sustane.com](mailto:help@sustane.com)

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