UF/IFAS Plant Nutrient Management Series

IFAS Recommendations for **HEMP** (Proposed)

General information

- UF/IFAS fertilization and liming recommendations are advisory in nature and emphasize efficient fertilizer use and environmentally sound nutrient management without losses of yield or crop quality.
- It is assumed the nutrients will be supplied from purchased commercial fertilizer and the expected crop yields and quality will be typical of economically viable production.
- Growers should consider UF/IFAS recommendations in the context of their entire management strategy, such as return on investment in fertilizer and the benefits of applying organic soil amendments.

Fertilizer rates

Note: The Mehlich 3 soil test has not been calibrated to guide hemp P, K, or Mg fertilizer recommendations in Florida. The recommendations below are intended to be used without a soil test.

		lbs/acre/cropping season		
	Target pH	**N**	**P_2O_5**	**K_2O**
Hemp for fiber				
300,000 plants/acre	6.25 – 7.5	50	0 – 30	50
750,000 plants/acre	6.25 – 7.5	150	0 – 30	100
Hemp for seed				
100,000 plants/acre	6.25 – 7.5	50	0 – 30	50
300,000 plants/acre	6.25 – 7.5	150	0 – 30	100
Hemp for flower				
3,000 plants/acre	6.25 – 7.5	150	0 – 30	50
15,000 plants/acre	6.25 – 7.5	150	0 – 30	100

Fertilizer applications of sulfur, calcium, magnesium, and other micronutrients may be identified through soil or leaf tissue tests. Maximum uptake of vigorous hemp crops has been demonstrated in trials outside of Florida to be 225 lbs N, 50 lbs P_2O_5, and 300 lbs K_2O per acre (Kaur et al., 2023). Uptake of N and K_2O at rates above those listed in the table have been demonstrated to be excessive and result in a plateau or decline in plant production and crop quality.

Fertilizer timing and placement

- Apply all the P_2O_5, 30% of the K_2O, and 30% N in a preplant or at-planting application.

- Apply the remaining K_2O and N in one or two more side-dressings, spaced approximately 4 weeks apart.
- Liquid fertigation can also be applied in weekly dosing for flower production under plasticulture.

Fertilizer sources

- N applications have been studied as granular fertilizer, though operation efforts have been deployed in other trials involving enhanced efficiency (controlled-release) fertilizer. Use of liquid fertilizer has also been effective (Anderson et al, 2021).
- Apply S as sulfate (e.g., gypsum, ammonium sulfate, magnesium sulfate, potassium sulfate, potassium magnesium sulfate) because elemental S will convert to sulfate too slowly to supply the sulfur needs of the current crop.

Water management

- Seeds and transplants require adequate moisture at planting for optimum establishment.
- Well-drained soils are preferred for hemp cultivation. Flooding exceeding 12-18 hours may substantially damage the crop and further expose it to disease.
- Based on operational experience, ½- to 1-inch irrigation per week is appropriate for fiber and seed crops by overhead and flower crop through drip. Consider using a soil moisture meter and increasing irrigation as needed per plant growth and soil moisture.
- Fertilizer and water management are linked. Maximum fertilizer efficiency is achieved only with close attention to water management. Supply only enough irrigation water to satisfy crop requirements. Excess irrigation may lead to N and K leaching, creating possible plant deficiencies.

References

Anderson, S.L. II, B. Pearson, R. Kjelgren, and Z. Brym. 2021. Response of essential oil hemp (Cannabis sativa L.) growth, biomass, and cannabinoid profiles to varying fertigation rates. PLoS ONE 16(7): e0252985. https://doi.org/10.1371/journal.pone.0252985

Kaur, N., Z. Brym, L. A. M. Oyola, and L. K. Sharma. 2023. Nitrogen fertilization impact on hemp (*Cannabis sativa* L.) crop production: A review. *Agronomy Journal*, 00, 1– 14. https://doi.org/10.1002/agj2.21345