

WHICH HEMP VARIETIES GROW BEST?

A NORTHEAST STUDY ON YIELDS AND ROOT COLONIZATION IN REGENERATIVE ORGANIC FIELDS

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OVERVIEW

While industrial hemp is becoming popular in the United States, we need to learn how different hemp varieties grow in organic farming and how their roots work with beneficial fungi (called AMF) to support sustainable farming and increase hemp's industrial use.

Arbuscular mycorrhizal fungi (AMF) help plants absorb nutrients and water by forming a beneficial relationship with their roots, which is important for maintaining healthy soil in regenerative organic farming.

Over two growing seasons (2022-2023), we studied the growth of four hemp varieties (MS 77, Futura 75, Santhica 27, and Han NE) in a regenerative organic system. We also examined root colonization to understand its connection with different hemp varieties and environmental conditions.

HIGHLIGHTS



We studied how Han NE and MS 77 varieties showed superior growth and yield in fiber hemp production in the Northeastern region.



The highest root colonization was found in MS 77 (45.37%), which may improve nutrient uptake and stress tolerance.

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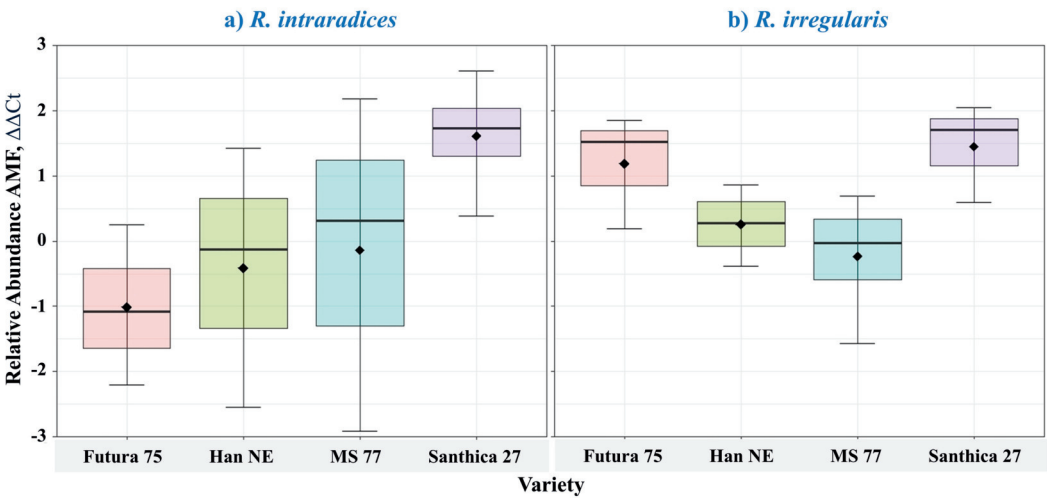
Han NE and MS 77 produced higher biomass and stem yield compared to Futura 75 and Santhica 27 (Table 1). Improved hemp production in 2023 indicates more favorable weather than 2022. All hemp varieties had similar root colonization, but MS 77 had the highest (Table 1). Two AMF species were identified, mostly *Rhizophagus intraradices* (Figure 1). Santhica 27 and MS 77 had higher levels, which could improve nutrient uptake.

TABLE 1. Varietal effect on observed parameters of fiber hemp production in 2022 and 2023.

Source of Variation	Plant Height	Biomass	Stem	Leaf	Flower	Root Length Colonization
	m	Yield, tons per acre				%
Variety						
Han NE	0.91	2.32	1.78	0.13	0.28	43.96
MS 77	0.73	2.04	1.57	0.12	0.27	45.37
Futura 75	0.64	0.94	0.5	0.14	0.21	45.05
Santhica 27	0.67	0.61	0.39	0.02	0.17	43.66
Year						
2022	0.69	1.14	0.84	0.06	0.17	-
2023	0.72	1.82	1.28	0.09	0.3	-

Note: Root length colonization data was collected in 2023 only. Detailed description of Table is included in the original article.

FIGURE 1. Boxplot showing the relative abundance of AMF species: (a) *R. intraradices* and (b) *R. irregularis*.



KEY TAKEAWAY

Warm temperatures boosted hemp growth, and MS 77 had the highest root colonization, helping it absorb nutrients and handle stress. Based on these results, Han NE and MS 77 are good choices for fiber hemp in this region.

