



# Performance of Lettuce Varieties in Greenhouse Hydroponic Production

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There is an increasing demand from consumers for locally grown and fresh leafy greens. According to the National Grocery Association, nearly 87% of consumers indicated that availability of locally grown foods could be a major influence on grocery shopping decisions. Lettuce is among the most popular leafy greens due to high dietary fiber, vitamins A and C, and antioxidant content. Many varieties of lettuce are grown in the U.S. Midwest in hydroponic culture, inside greenhouses, to support local markets. However, little published information is available on how individual varieties perform in hydroponic culture. Varietal screenings done in the warmer western climates looked at high temperature tolerance and stress recovery to improve yield (Han et al., 2016), but there is limited information on the performance of

lettuce varieties for the U.S. Midwest region.

There are three popular methods of growing lettuce in hydroponics: nutrient film technique (NFT), constant flood tables (CFT) and deep-water culture (DWC). NFT uses a thin film of fertilizer solution that runs down a gentle slope inside channels to grow plants. In CFT and DWC systems, roots are submerged in the fertilizer solution. Currently, limited information exists on individual varietal performance in different hydroponic systems.

Research was conducted at Purdue University, West Lafayette, Indiana, to evaluate the performance of 24 lettuce varieties grown in NFT and CFT systems (see Figure 1). Red and green leaf varieties belonging to leaf, oakleaf, romaine, and butterhead groups

were included in the trial. After 40 days, plants were harvested and dry weights recorded (which is directly correlated with fresh weight). Based on their weights, varieties were ranked within each group.

There were no differences in the performance of a variety between NFT and CFT production systems. In addition, differences were not consistent between red and green colored varieties. However, large differences in dry weight were present among different groups and among different varieties within a group. In general, higher yields were observed in the varieties belonging to leaf and romaine groups. The highest performing varieties from each group included Red Sails (Leaf), Salvius (Romaine), Salanova (Oakleaf), and Alkindus (Butterhead). Based on these results, we conclude that leaf and romaine varieties produce higher yields than other groups, lettuce varieties can be grown under both NFT and CFT production systems, and growers can select top-performing varieties within a group based on rankings shown in this study (Table 1).



**Figure 1.** Different lettuce varieties grown under NFT (white channels) and CFT (black trays) hydroponic systems in a glass greenhouse

**Table 1:** Variety Rankings by Dry Weight

Group	Rank	Variety	Color	Plant dry weight (g/plant)
Leaf	1	Red Sails	Red	16.2
	2	Walkmann's Dark Green	Green	14.0
	3	Cherokee	Red	11.6
	4	Black Seeded Simpson	Green	11.3
	5	New Red Fire	Red	10.5
	6	Nevada	Green	7.5
Romaine	1	Salvius	Green	18.6
	2	Dragoon	Green	14.1
	3	Breen	Red	9.2
	4	Truchas	Red	8.2
	5	Amadeus	Green	7.1
	6	Intred	Red	6.1
Butter-head	1	Alkindus	Red	10.2
	2	Butter Crunch	Green	9.4
	3	Adriana	Green	8.8
	4	Natalia	Green	7.9
	5	Rex	Green	7.9
	6	Skyphos	Red	5.0
	7	Salanova Red Butterhead	Red	2.6
Oakleaf	1	Salanova Green Oakleaf	Green	10.4
	2	Navara	Red	9.1
	3	Cedar	Green	8.5
	4	Red Salad Bowl	Red	6.4
	5	Salanova Red Oakleaf	Red	6.4

## References

Han, Y., Li, Y., Fan, S., Liu, C., Hao, J., Chen, Q., & Dong, J. (2016). Screening and identification of lettuce germplasm for tolerance to high and low temperature. *Acta Horticulturae*, (1127), 381-388. doi:10.17660/actahortic.2016.1127.59