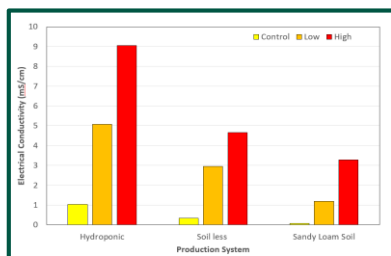
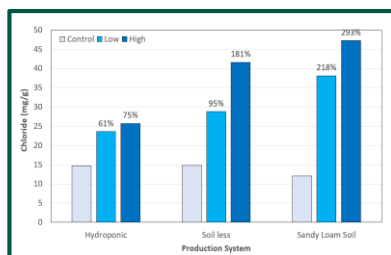


An all-out Assault on Basil

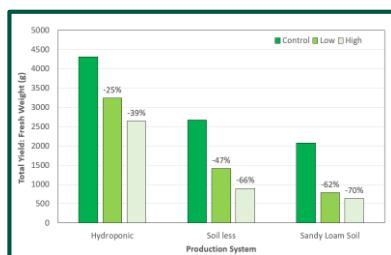
Jesse Mitchell, Carolyn Scagel, & Alec Temes



Salinity Around the Roots



Chloride in Plant Tissue



Salinity Effects on Yield

With many irrigation water sources becoming contaminated with salts, it is important to study the effects of salinity on horticulture crops. Our previous research reported that basil is somewhat salinity tolerant because it can partially exclude sodium from leaves and may be a useful crop for growers with poor quality irrigation water. Several crops, including medicinal and culinary crops such as basil, are commercially grown in a variety of systems (e.g. soil, soil-less substrate, and hydroponics). A recent study by Carolyn Scagel, Jesse Mitchell, Marjorie Storm, Suean Ott, and Milt Plocher, evaluated how salinity altered productivity and nutrition of basil in different production systems [hydroponic, soil less media (peat and bark mix), and a sandy loam soil].

Greater amounts of salt in irrigation water or hydroponic solution increased the electrical conductivity (salinity) around roots and accumulation of chloride (Cl) in the plant resulting in decreased yield in all systems. Irrigation with saline water can increase accumulation of toxic ions (including Cl- and Na+), and potentially cause nutrient imbalances and restrict yield.

Plants grown in hydroponics had the greatest yield, even though the roots were exposed to greater salinity than in soil and soil-less substrate. Salts can negatively affect plants by increasing water stress. We believe that basil grown in hydroponics is less sensitive to salt stress than in soil or soil-less substrate because roots have continual access to water and therefore have less water stress.

Understanding whether salinity tolerance of a crop differs among these systems is important for guiding growers on irrigation management and system selection. The physiological mechanisms by which plants manage the accumulation of different salt ions are not yet fully understood, and so further studies are needed.

If you have any questions or would like to know more, feel free to reach out to Jesse Mitchell at Jesse.Mitchell@usda.gov.



Experimental set-up



Basil at mid production



Root pillow from hydroponics

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