



# Impact of Irrigation on Photosynthesis, Water use and Heat Intensity of Chili Pepper

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## Introduction

To visualize the relationship between stomatal conductance, transpiration, and photosynthesis, Scoville Heat Units (SHU) across different pepper varieties under varying soil moisture levels.

Three hot pepper varieties used in this study:



Habanero



Lantern



Helios

Soil moisture levels:

Low (12-15%), Medium (15-18%), High (18-20%)

Plant physiological parameters:

Photosynthesis = Plant food making process (light energy to glucose)

Transpiration = Water loss from leaves

Stomatal conductance = Regulation of water loss and gaseous exchange through leaf pores (stomata)

SHU = Pepper heat (spicy) level

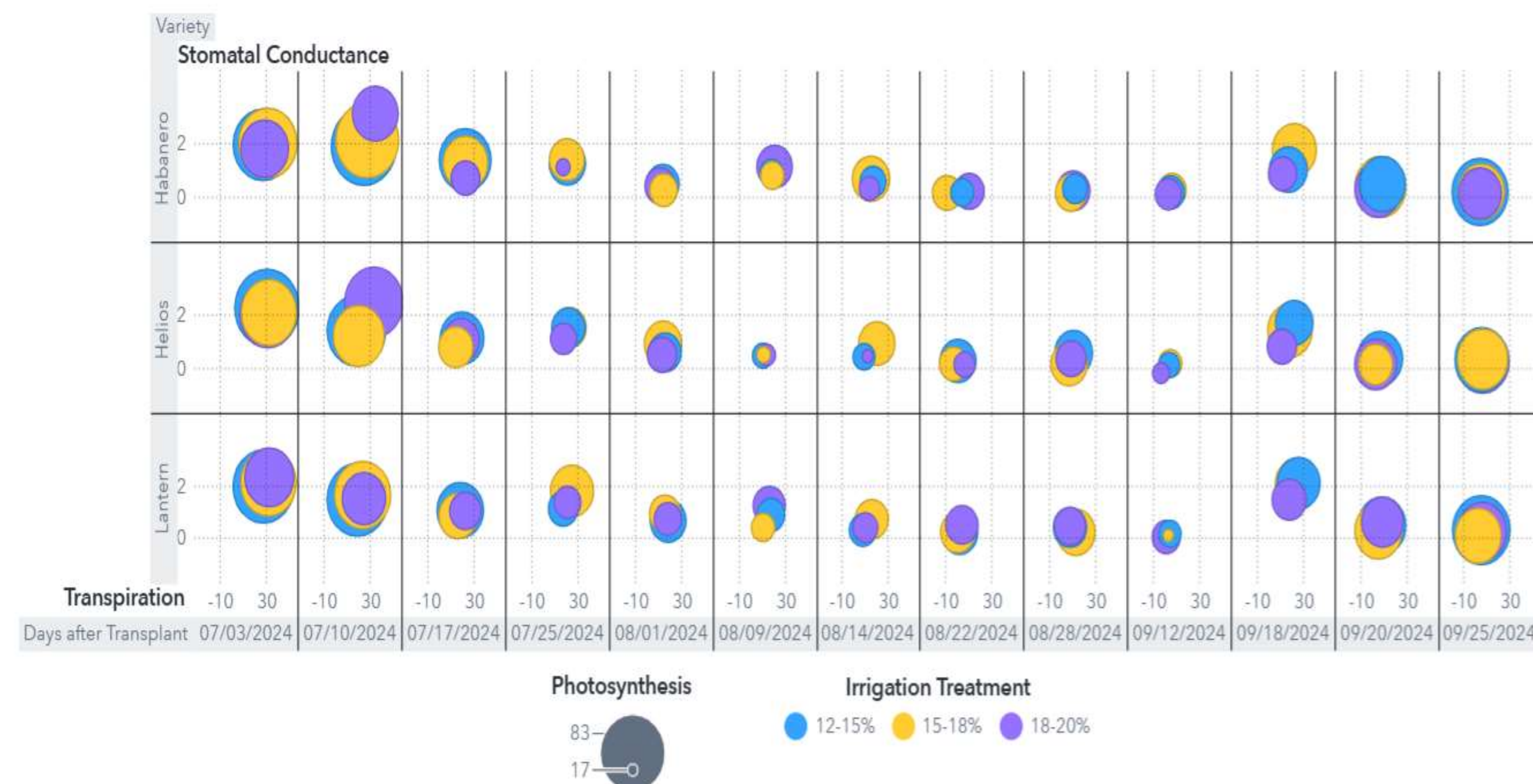
Data visualization was performed using **SAS Viya** to illustrate the effects of irrigation on plant physiology and pepper heat intensity.



LI-COR 6800 photosynthesis system measuring pepper parameters in a greenhouse

## Results and Discussion

Stomatal Conductance by Transpiration sized by Photosynthesis



Larger bubbles suggest higher photosynthetic activity

Overlapping bubbles indicate similar stomatal conductance and transpiration rate.

Bubbles overlap with smaller sizes shows photosynthesis is lower despite similar stomatal conductance and transpiration rate.

**Fig 2.** Bubble graph of stomatal conductance vs. transpiration across three pepper varieties, with bubble size representing photosynthesis rates. Colors indicate irrigation levels: blue (12-15%), yellow (15-18%), and purple (18-20%)

Scoville heat



Medium irrigation had the highest SHU (1.8M), followed by low (1.6M) and high (1.5M).

**Left Gauge (High)** → total SHU for the High irrigation level

**Middle Gauge (Low)** → total SHU for the Low irrigation level.

**Right Gauge (Medium)** → total SHU for the Medium irrigation level.

**Fig 3.** Gauge graph representing Scoville Heat Units (SHU) of hot peppers under different irrigation levels. Color zones indicate heat intensity, with green (high), yellow (moderate), and red (low)