Nutrient.TECH
THE EVOLUTION OF AGRICULTURE

Thermostat™

Abiotic stress is prevalent with most crops and can limit yields. Thermostat is a unique foliar technology for reducing abiotic stress.

In cases of temperature stress, plants regulate the opening and closing of stomata in response to temperature variations to maintain a balance between photosynthesis and water management. When temperatures are too high there are negative effects on the plant including:

- Denaturing of the enzymes involved in photosynthesis
- Closure of the stomata to reduce water loss (stops gas exchange)
- The production of free radicals

As air and leaf temperatures increase, stomatal conductance decreases, limiting carbon assimilation and photosynthesis.

Low Temperatures

- Reduced stomatal conductance (g_s)
- Stomatal limitation of carbon assimilation (A)
- Low temperature inhibits A through reduced Rubisco enzyme activity

Optimal Temperatures

- Optimal g_s
- Maximized carbon gain
- Optimal Rubisco activation
- Nutrient Translocation & partitioning
- Maximized yields & seed fertility

Extreme Highs

- Decreased g_s – water saving strategy
- Very high temps = g_s may increase if water available
- Trade-off between carbon gain and evaporative cooling
- Reduced seed fertility

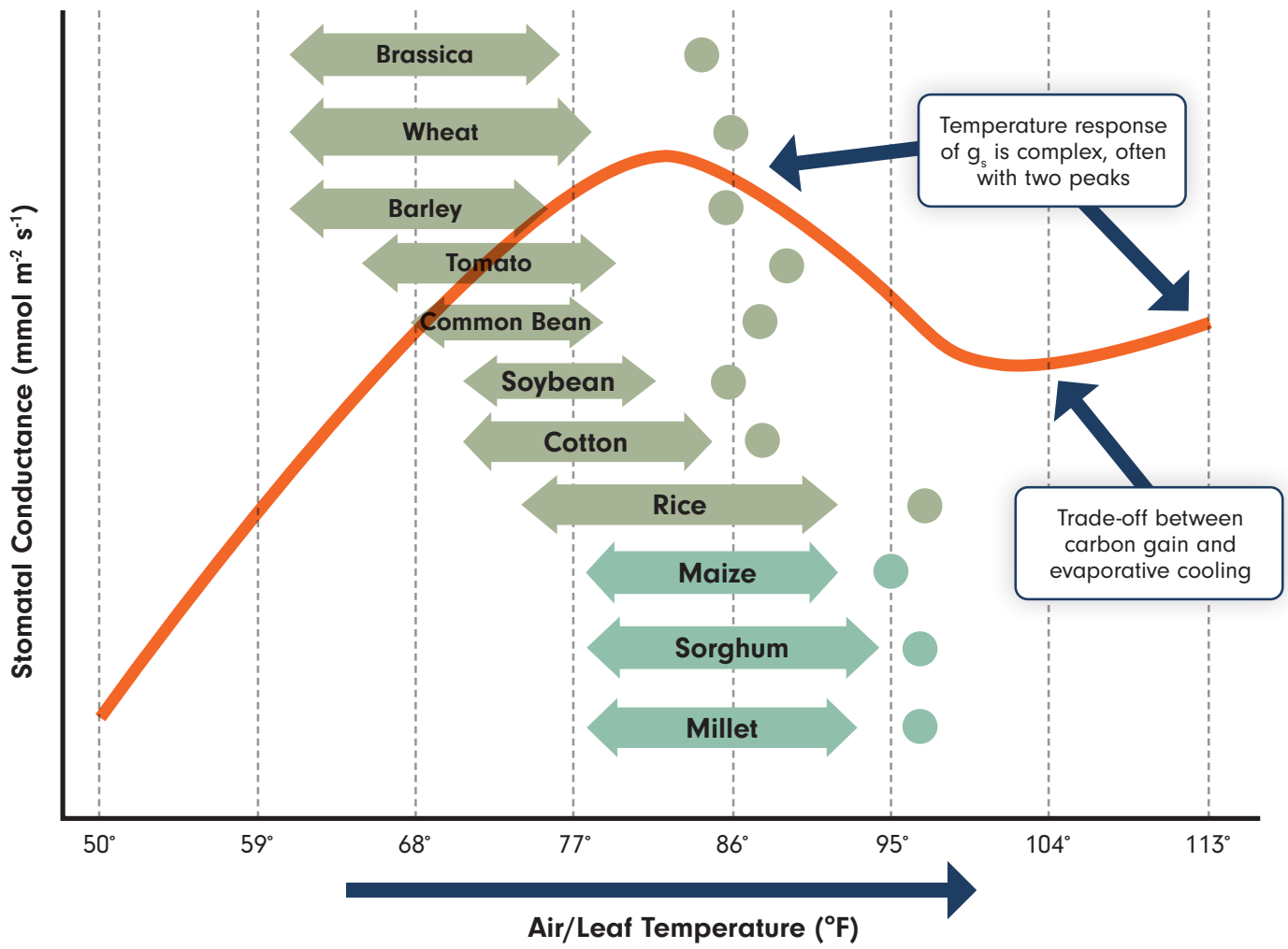

Fig. 4 Impact of temperature on changes in stomatal conductance and response in major cropping systems. Highlighted is a generic response of stomatal conductance (g_s) across a temperature range (red line); optimal temperature for major global crop types (two-headed arrows), including critical temperatures when biomass and yield are significantly reduced (dots). Reproduced with permission from Matthews and Lawson (2019).

For more information contact your Crop Advisor or visit www.Nutrient.TECH

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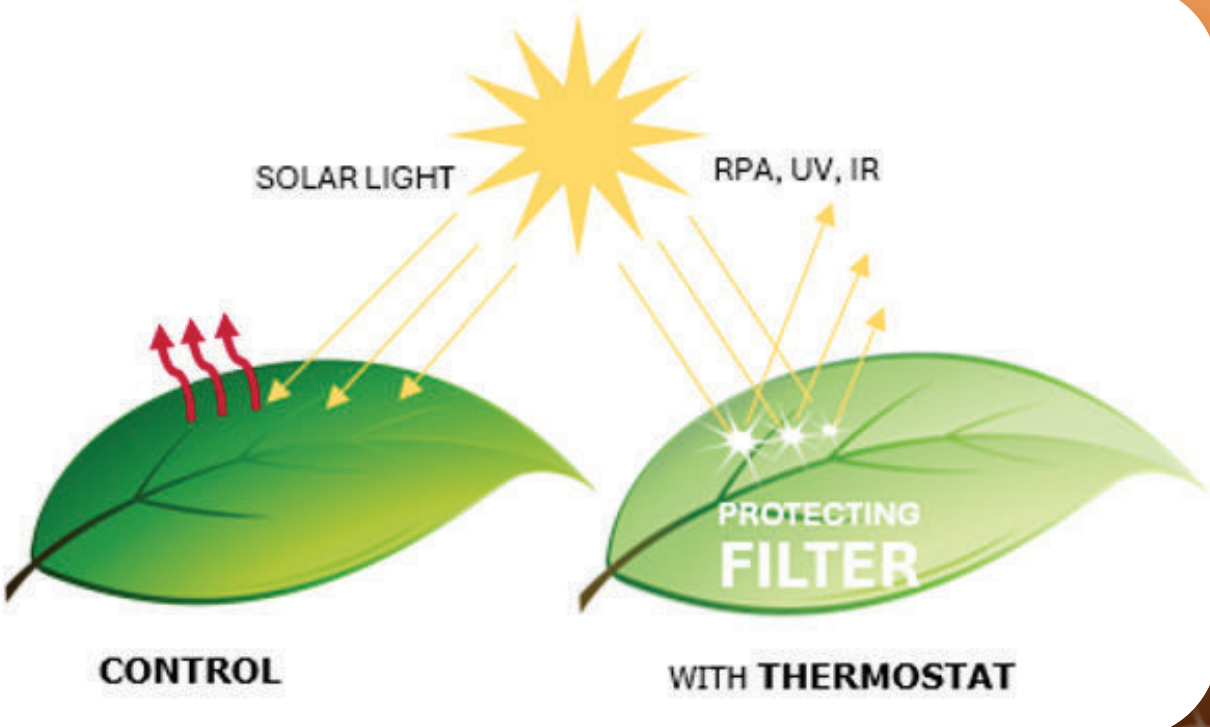
The compounds in Thermostat function as a sun protectant and osmoregulator. Thermostat is comprised of $CaCO_3$ (20%), $CaSiO_2$ (0.1%), and a selected amino acid to enhance osmoregulation. Calcium carbonate acts as a sunscreen deflecting heat and UV rays away from the leaf surface. The impact of Silica on abiotic stress is well documented. Silica strengthens cells, modulates nutrient and water mobility inside the plant, and stimulates the antioxidant system within the plant.



Thermostat can be applied at 2-3 pints/acre and is compatible with most crop protection materials. When mixed with sufficient water, Thermostat leaves minimal visible residue.

Studies have demonstrated a 2-6 °F reduction in leaf temperature lasting up to 21 days after application of Thermostat. Maintaining a lower leaf temperature with Thermostat allows the plant to continue to photosynthesize longer resulting in increased yield at harvest.

SAFE, EFFECTIVE AND EASY TO USE

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