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Extreme surface temperatures may threaten crop production

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Infrared radiometer monitoring surface temperatures in an Iowa soybean field in mid-June. Photo courtesy of Forrest Goodman.

Many agronomic management practices manipulate conditions at the soil surface, especially through tillage and crop residue removal. These practices are aimed at preparing the seedbed for crop germination by increasing soil temperatures, reducing soil water content, or suppressing weeds. However, researchers often overlook the effects of these practices at other periods of the growing season.

In a commentary recently published in *Agricultural & Environmental Letters*, researchers reflect on the importance of agronomic practices in determining soil surface conditions during the period after crop establishment but before canopy closure. The commentary is supported by soil surface temperature data collected over 12 years in a typical corn–soybean rotation in central Iowa.

Soil surface temperatures in late May and early June consistently exceeded 40°C, a threshold above which growth and development of many crops may be affected. Soil surface temperatures reached a maximum of 56°C. The authors discuss the implications of these temperatures on soil water balances, soil organic matter decomposition, nutrient budgets, aggregate stability, and erosion. They conclude that the cumulative effects of these conditions at the soil surface may pose a threat to long-term system stability and implore researchers and land managers to consider the unintended consequences of management practices.

Dig Deeper

O'Brien, P.L., & Hatfield, J.L. (2020). Extreme soil surface temperatures reflect need to rethink agronomic management. *Agricultural & Environmental Letters*, *5*.

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