Water and Temperature Stresses Impact Canola (*Brassica napus* L.) Fatty Acid, Protein, and Yield over Nitrogen and Sulfur

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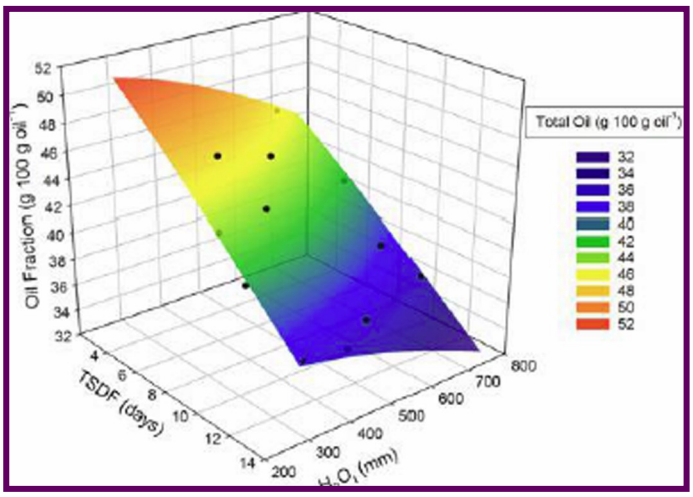

Figure 1. Total oil response to total available water (H2Ot) and atmospheric temperature (TSDF) at (adjusted R2 = 0.57).

Interactive effects of weather and soil nutrient status often control crop productivity and quality. An experiment was conducted to determine effects of nitrogen (N) and sulfur (S) fertilizer rate, soil water, and atmospheric temperature on canola (*Brassica napus* L.) fatty acid (FA), total oil, protein, and grain yield. Nitrogen and sulfur were assessed in a 4-yr study with two locations, five N rates (0, 45, 90, 135, and 180 kg ha−1), and two S rates (0 and 17 kg ha−1). Water and temperature were assessed using variability across 12 site-years of dryland canola production. Effects of N and S were inconsistent. Unsaturated FA, oleic acid, grain oil, protein, and theoretical maximum grain yield were highly related to water and temperature variability across the site-years. A nonlinear model identified water and temperature conditions that enabled production of maximum unsaturated FA content, oleic acid content, total oil (Fig. 1), protein, and theoretical maximum grain yield (Fig. 2).

Water and temperature variability played a larger role than soil nutrient status on canola grain constituents and yield.

For further reading, see on line reprint: Hammac, A.H., T.M. Maaz, R.T. Koenig, I.C. Burke, W.L. Pan. Water, temperature, and nitrogen effects on canola (Brassica napus L.) yield, protein, and oil. Journal of Agriculture and Food Chemistry 65: 10429–10438. https://pubs.acs.org/doi/abs/10.1021/acs.jafc.7b02778

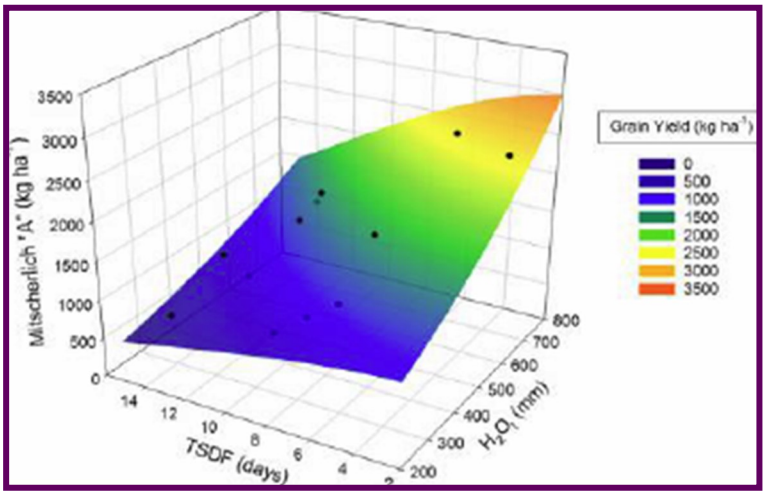

Figure 2. Mitscherlich theoretical maximum grain yield response to total available water (H2Ot) and atmospheric temperature (TSDF) at (adjusted R2 = 0.64)

Rhizosphere Microbial Communities of Canola and Wheat at Six Paired Field Sites

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Plant physical and chemical characteristics are known to alter rhizosphere microbial communities, but the effect of introducing canola into monoculture wheat rotations is not clear. Results from a field study in eastern Washington