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## Evaluation of heat stress period duration and the interaction of daytime temperature and cultivar on common bean

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### Highlights

- Photosynthesis, stomatal conductance and leaf photosynthetic pigments decreased
- Chlorophyll fluorescence parameters were affected by high daytime temperatures
- High temperatures caused oxidative stress
- Accumulation of proline reduced lipid peroxidation
- The physiological responses induced by high temperatures of bean plants are genotype-dependent

### Abstract

Two separated experiments were conducted to study the effect of various exposure periods of heat stress and the interaction of four common bean cultivars at different daytime temperatures. In the first experiment, 'Cerinza' plants were subjected to four periods (0, 5, 10, 20 d) at 40°C. In the second experiment, 4 cultivars of common bean ('Cerinza', 'Bachue', 'Bacata' and 'Bianca') were exposed to four different temperatures for 20 d. The results from the first experiment showed that the photosynthesis rate decreased by ≈94% (16.2 vs. 1.1 m<sup>-2</sup> s<sup>-1</sup>, respectively), while proline content increased by ≈100% (22 vs. 44 μmol g<sup>-1</sup>FW) in 'Cerinza' plants exposed to high temperature for 20 d compared to control plants. In the second experiment, photosynthesis and leaf photosynthetic pigments (chlorophyll and carotenoids) also diminished (≈45% and ≈40%, respectively) when the daytime temperature changed from 25 to 40°C in all cultivars. Proline and malondialdehyde were enhanced at 40°C, mainly, in 'Cerinza', 'Bachue', and 'Bacata'. 'Bianca' plants registered a high-stress susceptibility index and low-stress tolerance index scores at 30, 35 and 40°C. Based on these results, 'Cerinza', 'Bacata' and

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