

***Brassica Juncea* Response to Short Periods of Temperature and Water Stress at Different Growth Stages**

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ABSTRACT

Brassica juncea is a new canola type and is best adapted to the semiarid Brown and Dark Brown soil zones. No-till, direct-seeded *Juncea* canola often matures uniformly which offers producers opportunity for straight combine. Seed yield of conventional canola species grown in this semiarid environment is often limited due to heat and drought stress. No information is available about the response of this new canola species to the stressful conditions. A growth chamber study was conducted to determine the effect of short periods of high temperature and water stress at different developmental stages on seed yield and yield components of Brassica crops. Two *B. juncea* canola 'PC98-44' and 'PC98-45', a *B. napus* canola 'Quantum', and a *B. juncea* oriental mustard 'Cutlass' were grown under 20/18 °C day/night temperatures. High (35/18 °C) and moderate (28/18 °C) temperature stress was imposed for 10 d during bud formation, flowering, and pod development. Low (90% available water) and high (50% available water) water stress was imposed in each temperature treatment. On average, the 35/18 °C stress reduced main stem pods by 75%, seeds pod⁻¹ 25%, and seed weight 22% from the control. Seed yield per plant was reduced by 15% when plants were severely (35/18°C) stressed during bud formation, 58% when stressed during flowering, and 77% when stressed during pod development. Plants stressed at earlier growth stages exhibited recovery, whereas stress during pod development severely reduced all yield components. Effect of water stress on seed yield was minimal regardless of crop developmental stage. The four Brassica cultivars tested in this study responded to the stress similarly in general with water stress having less effect on yield than temperature stress. Under stress conditions, *B. juncea* produced highest number of pods per plant but a great rate of pod infertility compared to conventional canola. Seed yield of *B. juncea* canola in semiarid environments can be increased by improving pod fertility.