

**ELEVATED CO<sub>2</sub> EFFECT ON TOLERANCE OF *ERAGROSTIS PLANA* TO GLYPHOSATE AND DROUGHT STRESS.** M.O. Bastiani\*<sup>1</sup>, F.P. Lamego<sup>2</sup>, L. Benedetti<sup>3</sup>, F.C. Caratti<sup>3</sup>, G.M. Souza<sup>3</sup>, N. Roma-Burgos<sup>1</sup>; <sup>1</sup>University of Arkansas, Fayetteville, AR, <sup>2</sup>Embrapa Pecuária Sul, Bagé, Brazil, <sup>3</sup>Universidade Federal de Pelotas, Pelotas, Brazil (116)

### ABSTRACT

Climate changes are expected to impact the sustainability of native grasslands as well as the success of invasion by invasive weeds. Increase in atmospheric CO<sub>2</sub> levels and occurrence of drought periods could influence the growth of many invasive plant species, and therefore may affect herbicide efficacy. *Eragrostis plana* (tough lovegrass) is an invasive weedy grass in several native pasture areas in South America and is adapted to a wide range of environment conditions including areas with water limitation. Based on current and predicted global climate changes, we performed an experiment to determine whether rising CO<sub>2</sub> concentration would increase *Eragrostis plana* tolerance to glyphosate under drought conditions. The experiment was conducted in Open Top Chambers (OTCs) under two levels of atmospheric CO<sub>2</sub> concentration (400 and 700 ppm), two water treatments (well-watered and drought stress conditions) and with and without glyphosate treatment. The water stress was initiated 30 days before glyphosate treatment and terminated 60 days after herbicide treatment (DAT) when plants were harvested. Elevated CO<sub>2</sub> (700 ppm) reduced stomatal conductance ( $g_s$ ) under well-watered conditions, but not under drought conditions. At 7 DAT, the control of *E. plana* was higher at 700 ppm CO<sub>2</sub>, however there was no CO<sub>2</sub> effect at 60 DAT. Water stress reduced glyphosate efficacy at 7 and 60 DAT, regardless of CO<sub>2</sub> level. Shoot biomass reduction by glyphosate treatment was 61% and 43%, while root biomass reduction was 94% and 65 % for well-watered and drought conditions, respectively. Under drought stress without glyphosate treatment, physiological variables (RWC and  $g_s$ ) or growth variables (shoot and root biomass) were significantly reduced compared to well-watered condition regardless of CO<sub>2</sub> levels. Overall elevated CO<sub>2</sub> does not stimulate growth and does not increase tolerance to glyphosate or drought stress in *E. plana*.