

**PROJECT TITLE**

Interaction between nitrogen availability and elevated [CO<sub>2</sub>] and its effects on photosynthesis and growth of sorghum varieties

**CONSORTIUM**

P 1	Rafael Ribeiro		
P 2	Eduardo Machado		
P 3	Paul Struik		
P 4	Xinyou Yin		

## SUMMARY OF THE REPORT

We tested the hypothesis that sorghum plants would respond to high air [CO<sub>2</sub>] under limiting nitrogen supply. Photosynthesis and biomass accumulation were evaluated in three cultivars BRS655 (for forage), BRS511 (for grain) and BRS373 (for bioenergy) grown for 30 days under low (48 ppm N) or adequate (211 ppm N) nitrogen supply and under current (400 ppm) or high (800 ppm) air [CO<sub>2</sub>]. Light and CO<sub>2</sub> response curves of photosynthesis were performed under 21% and 2.5% O<sub>2</sub> in order to estimate photosynthetic traits, including the bundle-sheath conductance. Plant growth was also evaluated in each experimental condition. Our initial hypothesis was not corroborated and there were no positive responses of photosynthesis or plant growth to high air [CO<sub>2</sub>]. In fact, the response to nitrogen availability was cultivar-dependent, with the cultivar for bioenergy production (BRS373) being the most sensitive one and the cultivar for grain (BRS511) the most insensitive. Such findings will be revisited when we have all dataset available, which includes leaf nitrogen content and Rubisco and PEPC abundances. With such dataset, modeling for estimation the bundle sheath conductance will be done and then the influence of changes in nitrogen supply and air [CO<sub>2</sub>] on the efficiency of CO<sub>2</sub> concentration mechanism evaluated.