CONTRASTING MAIZE GENOTYPES EVALUATION UNDER WATER AND NITROGEN STRESS CONDITION USING THE CHLOROPHYLL FLUORESCENCE ANALYSIS.

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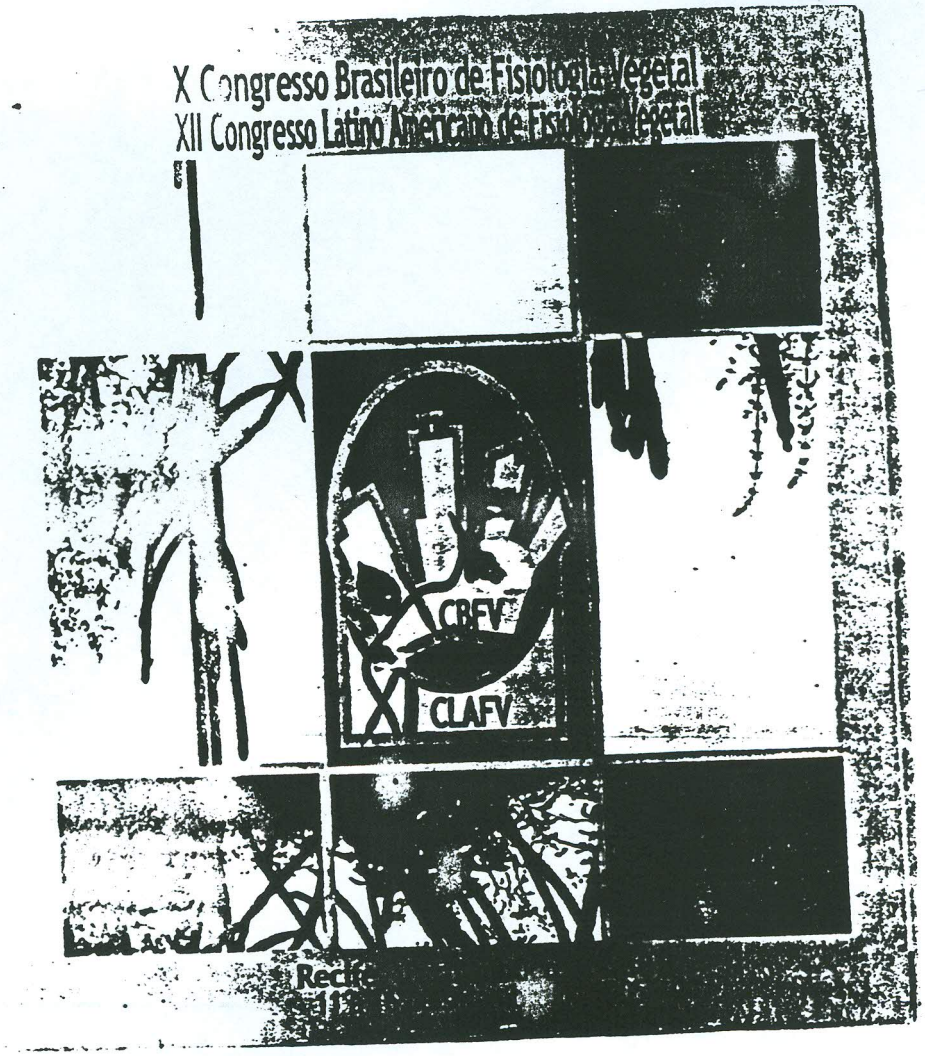
Water (*W*) and nitrogen (*N*) stresses, and interactions often reduce maize yield. Nitrogen deficits modify morphological and physiological characteristics, which may influence its relationship with water. The objectives of this work were to evaluate contrasting maize genotypes to *W* and *N* stress condition using chlorophyll fluorescence technique. Dry matter, grain yield, photosynthetic rate (gas exchange), and chlorophyll fluorescence parameters responses of contrasting genotypes were determined for analysis and correlation. The two contrasting inbred lines water stress susceptible (G1) and stress tolerant (G2), and their F_1 hybrid (G3) were grown in the greenhouse. Plants were grown under two water levels (*W*ell-*W*atered and *W*ater-Stressed) and three *N* levels (75, 50, 25 ppm *N* nutrient solution). Leaf chlorophyll content was measured for growth stages (V4, V6, V8, and flowering) using a *SPAD chlorophyll meter*. On these same dates leaf CO_2 assimilation (*A*) and several chlorophyll fluorescence (*CF*) parameters, including maximum fluorescence (*Fm*), were determined for both dark adapted and fully illuminated leaves using the *LI-COR model 6400* photosynthesis system. Total dry mater (*DM*) and final grain yield (*GY*) were measured at maturity. Treatment variation in *A* was closely associated with variation in final *DM* and *GY*, particularly during flowering, and variation in *A* was in turn highly correlated with variation in electron transport rate (*ETR*). Measurement of leaf chlorophyll content, *A*, *CF*, and final *GY* revealed that G2 and its hybrid with G1 maintained a distinct advantage over G1 under *W* and *N* stress conditions. *ETR* was highly correlated with *A* and can be used to rapid assessment of *W* and/or *N* stress effects on maize. *Fm* was found to be a more powerful indicator of *N* or *W* stress. The inbred line G2 and its hybrid with G1, evaluated by *CF* technique, showed good performance under *W* and *N* stress conditions.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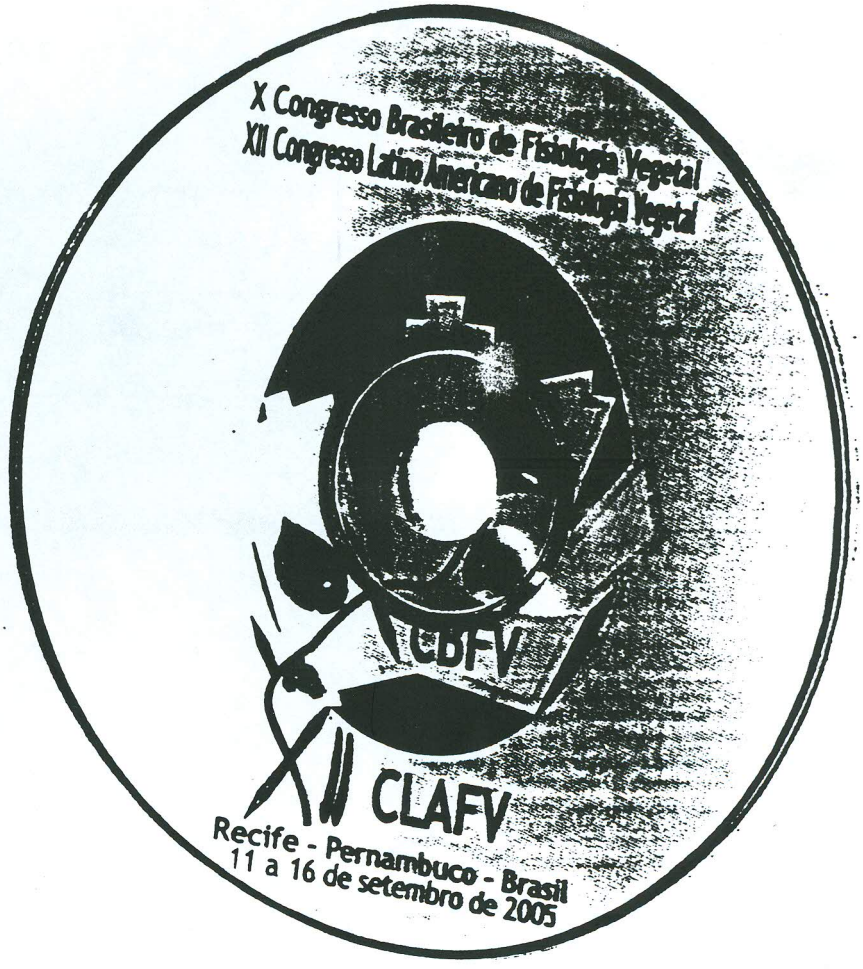
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