

CONSTRUINDO SABERES, FORMANDO PESSOAS E TRANSFORMANDO A PRODUÇÃO ANIMAL

QUANTUM EFFICIENCY AND CULTURAL HYDRICAL FOOTPRINT OF CACTUS FORAGE GENOTYPES IN THE BRAZILIAN SEMI-ARID

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The Cactus forage (*Opuntia* sp. or *Nopalea* sp.) stands out as one of the plants with the highest potential for forage cultivation and yield in semiarid conditions, serving as the foundation for animal feed in this region, especially in times of drought. A selection of new genotypes of the cactus is essential, mainly due to the low number of existing genotypes. With consideration to this context, an experiment was conducted from January to November of 2017 at the Benjamim Maranhão Experimental Station, run by EMEPA-PB, The State of Paraíba's Agricultura Research Agency, located in the town of Tacima, in the state of Paraíba, Brazil. The aim of the study was to evaluate the quantum efficiency and the cultural water footprint of the Cactus forage genotypes. The trial design consisted of randomized blocks, with six treatments, corresponding to V07 Negro Michoacan, V14 California, T03 Raio Vigor, T42 Amarilla Vach, FR Kirekteur and F16 Oreja de Elefante genotypes and three repetitions, with 20 plants. All of the genotypes are of Mexican origin and obtained from EMEPA's germoplasm banks. Variables evaluated included initial chlorophyll fluorescence, maximum and variable, potential quantum yield, rainwater use efficiency and cultural water footprint. It was observed that genotypes V14, T03 and T42, and FR had a higher average of initial fluorescence, 58.7 quantum electrons⁻¹. Genotypes T03, T42, V07, V14 and FR did not present different maximum fluorescence, however F16 had the lowest index (235 and 184.2 electrons quantum⁻¹, respectively). The potential quantum yield was lower in genotypes F16 (0.77 electrons quantum⁻¹), at least 2.5% lower in relation to the other genotypes, which makes this genotype less efficient in capturing excitation power by photosystem II reaction centers. As for efficiency of water use, genotypes V07, V14 and F16 were superior, with averages of 38.40, 52.64, and 42.07 kg of dry material ha⁻¹/mm⁻¹ rain. Cultural water footprint (CWF) of genotype FR was (CWF 1.369m³ of water per Mg dry matter ha⁻¹, water demand of at least 130% in relation of the other genotypes. The genotypes V07 and V14 were more efficient in the photochemical activity of photosystem II and efficiency in water use during the experimental period.

Keywords: Adaptation, cactus, ecophysiology, selection

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