

SOME PHYSIOLOGICAL FEATURES AND THE PRODUCTIVITY OF THE ENERGY CROPS *MISCANTHUS X GIGANTEUS* AND *SORGHUM ALMUM* UNDER THE CONDITIONS OF THE REPUBLIC OF MOLDOVA

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Abstract

This article presents the results of scientific research on some physiological processes in the energy crops *Miscanthus x giganteus* 'TITAN' and *Sorghum alnum* 'ARGENTINA', grown under the conditions of the central area of the Republic of Moldova, the dry biomass yield and quality indices of the obtained solid biofuels. The obtained results show the establishment of the physiological-biochemical activity in the species *M. x giganteus* by the values of the indices of photosynthesis intensity ($3.39-8.68^2 \mu\text{mol m}^{-2} \text{s}^{-1}$), in correlation with the intensity of transpiration ($0.59-2.02 \text{ mmol m}^{-2} \text{s}^{-1}$), respiration ($0.02 \text{ mol m}^{-2} \text{s}^{-1}$) and the efficiency of photosynthetically active radiation (PAR) ($320-385. \mu\text{mol m}^{-2} \text{s}^{-1}$). Comparative values of the resulting indices were established simultaneously for the species *S. alnum*, with the values estimated in the process of photosynthesis ($15.77-17.18 \mu\text{mol m}^{-2} \text{s}^{-1}$), the intensity of transpiration ($1.26-1.84 \text{ mmol m}^{-2} \text{s}^{-1}$) and the efficiency of photosynthetically active radiation (PAR) $1061-1565 \mu\text{mol m}^{-2} \text{s}^{-1}$. These results show that the values of photosynthesis and PAR indices are more active and higher in *M. x giganteus* as compared with the values of the indices of *S. alnum*. It was established that the stem dry biomass yield in the second season reached $1.18-1.89 \text{ kg/m}^2$, with a content of 45.23-45.64% carbon, 5.76-5.91% hydrogen, 0.25-0.40% nitrogen, 0.05-0.06% sulphur, 1.25-4.40% ash, 18.99-19.20 MJ/kg gross calorific values and 17.30-17.45 MJ/kg net calorific values. The specific density of briquettes reached $770-850 \text{ kg/m}^3$ and the specific density of pellets $970-1070 \text{ kg/m}^3$. The local cultivars of *M. x giganteus* and *S. alnum* may serve as feedstock for renewable energy production

Key words: *Miscanthus x giganteus* 'Titan', *Sorghum alnum* 'Argentina' physiological parameters, productivity