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ENVIRONMENTAL STUDIES ON ARUNDO DONAX

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EXTENDED ABSTRACT

The objective of this study is to evaluate, in terms of yields performance and water use efficiency, the influence of irrigation and nitrogen fertilization on the productivity of *Arundo donax* L. and provide information on the crop production using reduced water supplies and low inputs. *Arundo donax* L. is a native species to Mediterranean region. It is characterized by a high yielding potential as well as by efficient use of the natural resources.

To achieve the goals of this work, two trials have been set up, one by CRES in south Greece and the other by University of Catania in south Italy where *Arundo donax* was grown under several regimes of irrigation (I) and nitrogen fertilisation (N), namely I_0=dry control, I_1=50% of ET max, I_2=100% of ET max, N_0=40 kg N/ha and N_1=120 kg N/ha in the first trial and I_0=control, I_1=50% of ET max, I_2=100% of ET max, N_0=0 kg N/ha, N_1=60 kg N/ha and N_2=120 kg N/ha in the second trial.

Comparing the yields of the first, second and third years, it was revealed that total dry matter in the I_0 treatment ranged from 10 to 21 t/ha, depending more on the treatment applied than the experimental site. I_2 treatment ensured high dry matter yields from as early as the first year, which reached 20-25 t/ha in both fields. These yields remained the same in all years in the Greek trial, while in the Italian one a decrease (15-20 t/ha depending on the nitrogen treatment) was noticed in the second year, which however applied to all treatments.

Concerning the water use efficiency (WUE), the reduction of the water consumed by the crop resulted in an increase of the WUE, attaining maximum values of 6 g d.m./l in Vagia and 10 g d.m./l in Catania. The reduction of nitrogen fertilisation determined a generally small reduction of WUE in Catania, whereas it did not affected WUE in Vagia.

In general, the irrigated plants had a tendency to show better growth and yield performance. In conditions of low soil water availability the plant was able to improve the water use efficiency and maintain a high level of production, to a certain extent similar to that of the well watered plots (I_2). This means that *A. donax* could be successfully grown under moderate irrigation. It is also worth to be noted that *Arundo donax* was able to make useful use, at least in the conditions of Catania, of the nitrogen fertilisation, showing also the good capacity of the crop to catch the nitrogen in the soil preventing thus nitrate leaching in the subsoil.

Key words: arundo, biomass production, water and nitrogen treatments, water use efficiency