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Yield Of Lignocellulosic Perennial Grasses Under Different Soil Water Availability

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Introduction

Perennial crops are recognised to be more efficient than annual crops concerning the biomass production. Among them, giant reed (*Arundo donax* L.), miscanthus (*Miscanthus* x *giganteus* (Greef et Deuterand)) and African fodder cane (*Saccharum spontaneum* L. ssp. *Aegypticum* Wild (Hack.)) are selected as the most suited to Mediterranean condition, characterized by summer drought. The field trial aims to assess the response of diverse lignocellulosic perennial grasses under three different irrigation regimes during summer in the second year after plant establishment.

Materials and Methods

Three irrigation levels and six genotypes were evaluated in a split-plot experimental design with three replications.

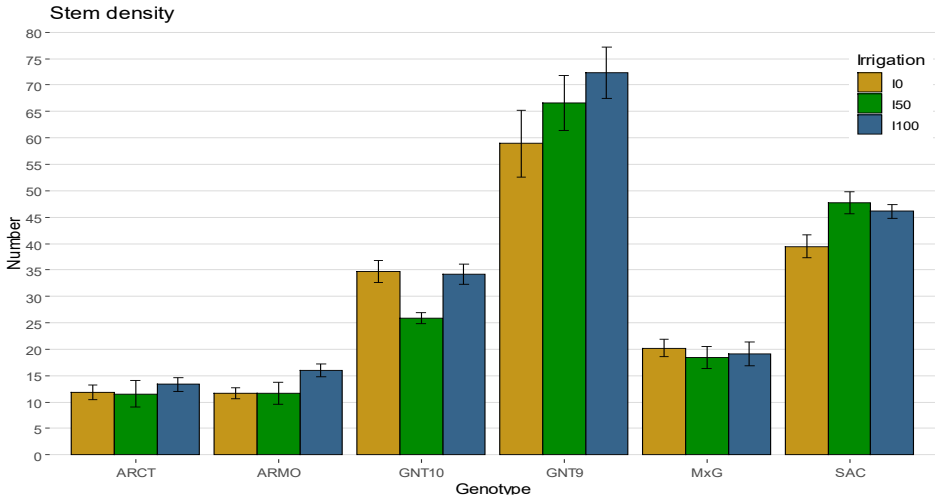
The main factor assigned to the plots is the irrigation factor, with 3 levels:

100%, 50% and 0% of maximum crop evapotranspiration (ETm) restoration during the summer months (June-August).

The sub factor was the genotype: two *A. donax* L. ecotypes (ARCT and ARMO), the commercial *Miscanthus* x *giganteus* (MxG), two seed-based *Miscanthus* hybrids (GNT9 and GNT10), and one ecotype of S. spontaneum (SAC).

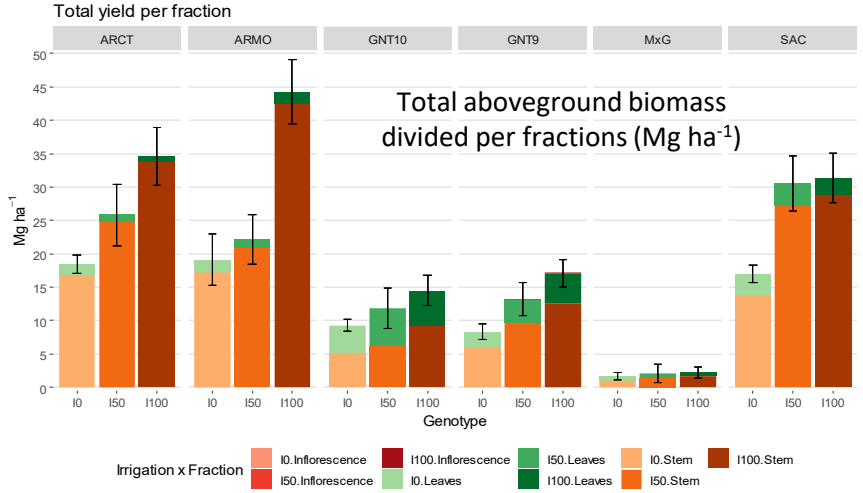
In mid-winter the stems were collected from a 4 m^2 subplot, counted for stem density and weighted as fresh and dry biomass. The aboveground biomass (AGB) yield was calculated from the dry biomass production of the subplot.

Results



Stem density (stems m^{-2}) for 3 water restoration levels (I0, I50, I100) and for 6 genotypes examined in this study

A. donax achieved the highest biomass yield in both full irrigated and rainfed conditions, while *S. spontaneum* showed the highest yield at the partial irrigated level. *Miscanthus* hybrids have lower biomass yield.



Conclusions

Irrigation is a key factor in achieving high biomass yield in the semi-arid Mediterranean environment; however, selected genotypes can provide acceptable AGB yield even under rainfed management.

The experiment proves that Mediterranean native species are more suited than biomass crops that are selected for northern climates.

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