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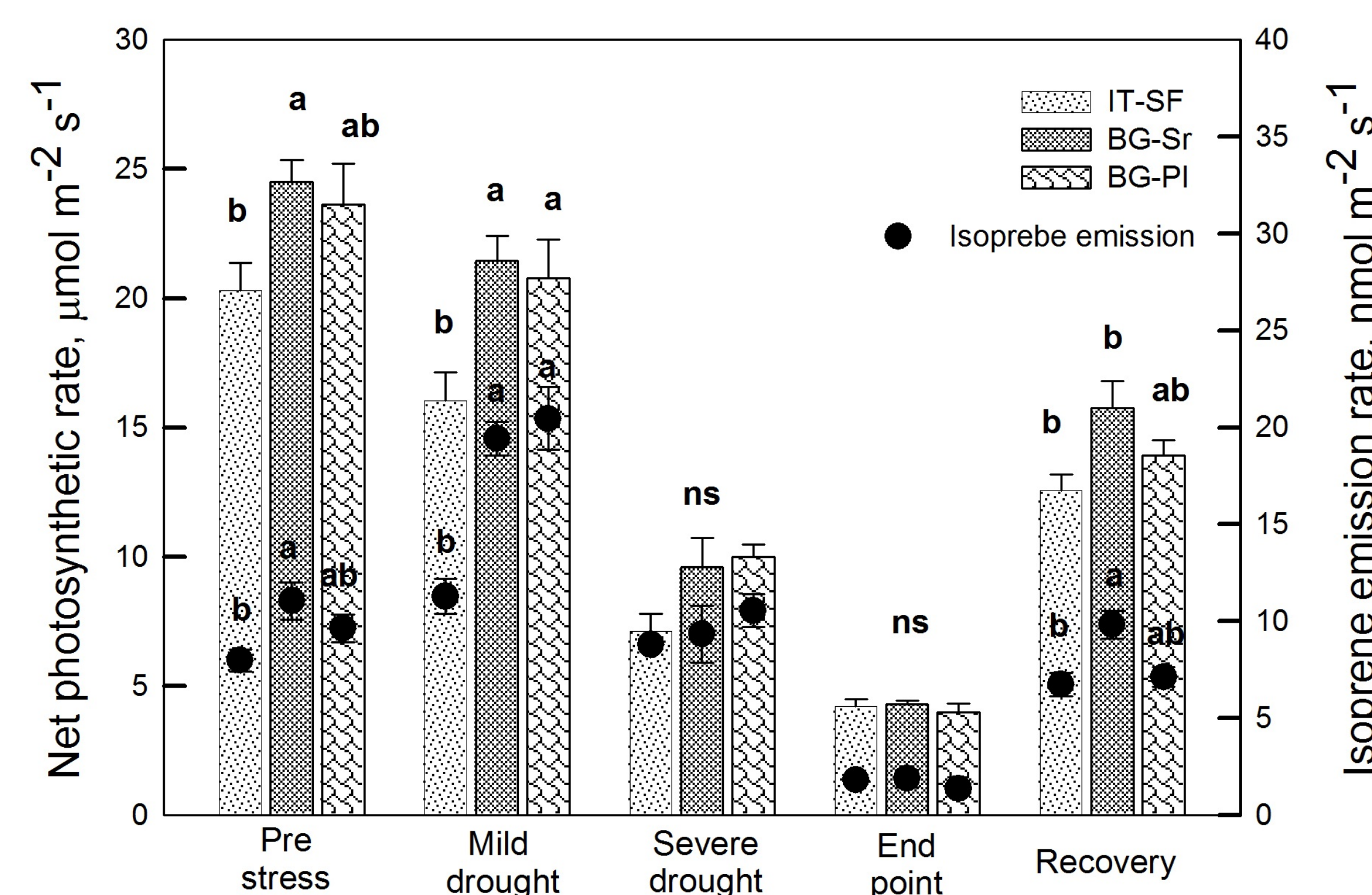
## Introduction

*Arundo donax* is a promising biofuel crop for Mediterranean regions. *Arundo* leaves emit isoprene, an important biogenic volatile organic compound (BVOC) with a significant effect on air quality. Isoprene can have a protective role under stress conditions and may trigger the production of secondary metabolites with antioxidant effects. Ecological factors such as hydrophily could affect the plant capacity to emit isoprene. We studied isoprene emission and other physiological and biochemical parameters of three different ecotypes of *A. donax* under progressive drought. The possible link between isoprene emission and biosynthesis of other secondary metabolites as well as their effect on drought tolerance of *Arundo* ecotypes will be discussed.

## Materials & Methods:

The *Arundo* rhizomes were collected from Bulgaria (Srebarna, Plovdiv) and Italy (Sesto Firoentino). Plants were exposed to drought by withholding irrigation. Data for leaf gas exchange, isoprene emission (PTR-MS), carotenoids and phenypropanoids (HPLC) and proline were collected.

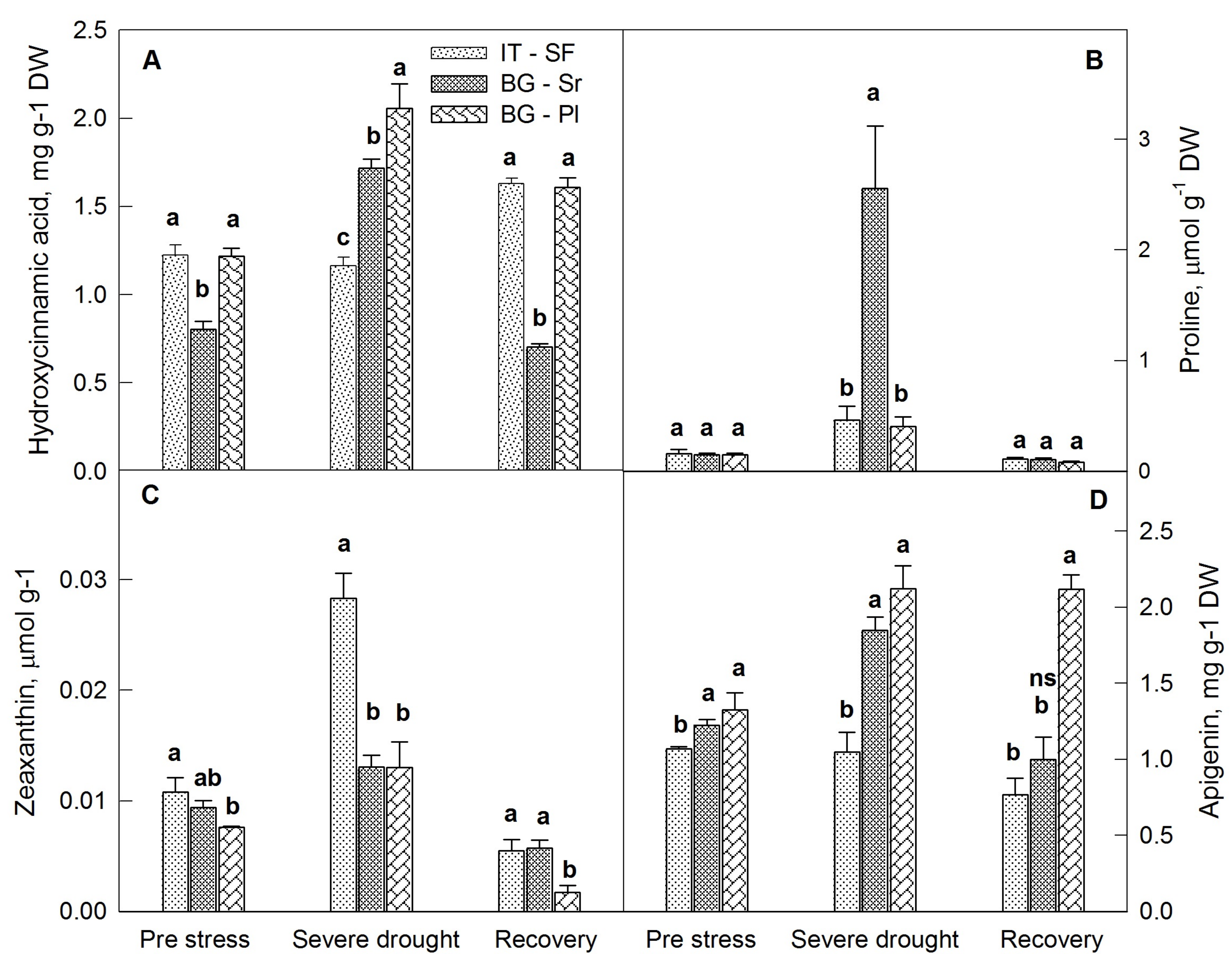
## Results :



Net photosynthetic rate ( bar charts) and isoprene emission rate (closed circles) of three ecotype of *A. donax* ( IT-SF), (BG-Sr), (BG-PI) at pre-stress , different levels of drought and recovery.

Photosynthetic parameters obtained from fitting the A-Ci responses curves at pre-stress, severe drought and recovery

		Pre stress	Drought	Recovery
J <sub>max</sub>	SF	146.5± 6.7b	30.3± 3.8a	112.1 ± 5.9b
	Sr	176.7±4.7a	31.3±5.1a	157.9±6.7a
	PI	180.6±10.2a	37.8±4.6a	134.1±11.6a
V <sub>cmax</sub>	SF	213.5±14.9a	37.7± 4.1a	167.4 ± 9.6b
	Sr	235.2± 11.3a	31.7± 5.7a	241.1±14.9a
	PI	232.2±24.3a	43.3±1.6a	226.8±6.1a



Concentration of Hydroxycinnamic acid (A), Proline (B), Zeaxanthin (C), Apigenin ( D) in the leaf samples of the Italian ecotype of *A. donax* , Sesto Florentino ( IT-SF), and two Bulgarian ecotypes, Srebarna ( BG-Sr) and Plovdiv ( BG- PI) at pre-stress , severe drought and recovery.

## Conclusion:

- ☐ The physiological performance of ecotypes was affected by their provenience.
- ☐ We suggest that higher isoprene emitting capacity of Bulgarian ecotypes improved their drought tolerance compared with Italian ecotype.
- ☐ Higher isoprene emission of Srebarna ecotype might be associated with its hydrophily.
- ☐ Under severe drought, phenylpropanoid biosynthesis might be up-regulated by higher activity of isoprene pathway.
- ☐ Phenols and non-volatile isoprenoids may serve as ROS scavengers under drought in *Arundo* ecotypes.
- ☐ The studied ecotypes had different biochemical approaches to deal with drought.

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