Salt affected soils in Croatian coastal agricultural land under changing climate

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INTRODUCTION

- According to The Strategy for Adaptation to Climate Change of the Republic of Croatia until 2040 with a view to 2070 (OG 46/2020) climate change will have significant direct and indirect impacts on agriculture due to the trend of rising sea levels and salinization of karst aquifers
- **The Neretva River Delta (NRD)** is one of the most vulnerable coastal areas to **soil salinization** as a result of climate change, especially sea level rise and seawater intrusion
- **In 2020**, as part of the DELTASAL project (funded by the European Union - European Regional Development Fund), **on location Vidrice** within the NRD, **advanced automatic soil and water salinity monitoring system was established**
- **The objective of this work** was to assess the **seasonal variation of soil EC_b** considering irrigation and rainfall in mandarin orchards in 2021

MATERIALS AND METHODS

Neretva River Delta – polder Vidrice

Groundwater and soil salinity monitoring

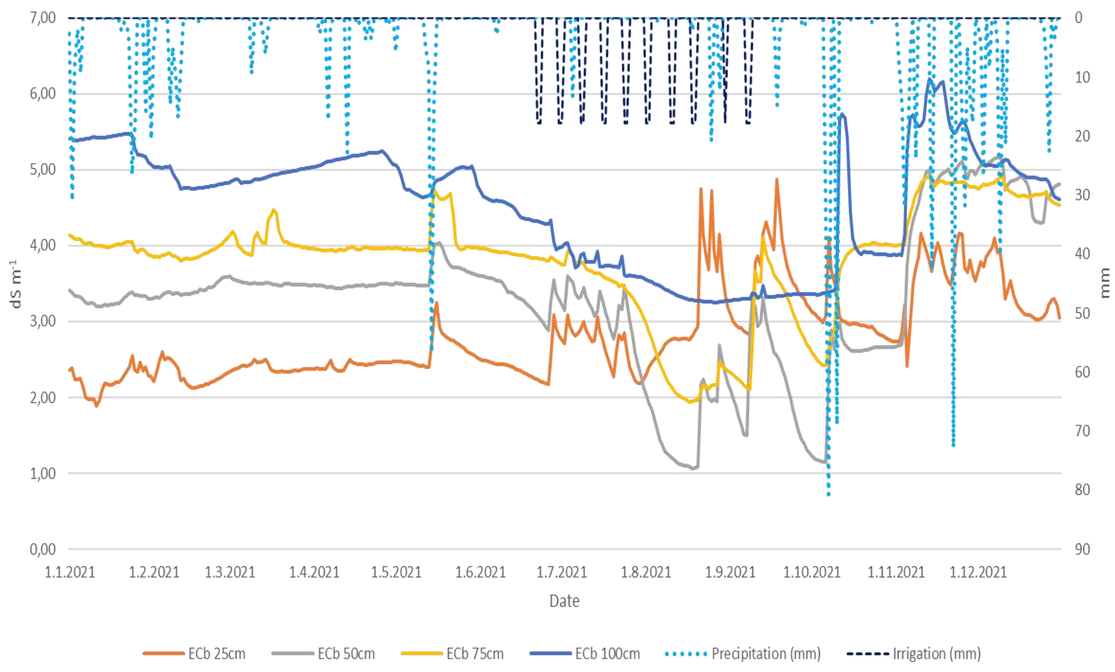
Automatic weather station

Surface water salinity monitoring

- Aquaread AP5000 water quality multiparameter probes were installed to monitor surface water and groundwater salinity
- The TEROS 12 (Meter Group) sensors measuring soil temperature, bulk electrical conductivity (EC_b), and volumetric water content using frequency-domain technology were installed every 25 cm up to 1 m
- Pinova automatic weather station was installed to record rainfall, air temperature and moisture, wind speed and global radiation.
- Data from each station and sensor is collected at high temporal resolution
- Irrigation (date, duration and quantity) was recorded manually by the producer

FIRST RESULTS

- Irrigation season started in late June and finished in first decade of September
- **Prior to the irrigation season (January-June), EC_b values were stable at all horizons** because most salts leached before January 2021 (475 mm of precipitation fell from October 2020 to January 2021)
- During the irrigation season, the mean value of water EC used for irrigation was 2.1 dS m^{-1} with a maximum value of 2.6 dS m^{-1} in August
- **More significant changes in EC_b occurred during and especially after the irrigation season.** Mean values of EC_b before the start of irrigation were 2.4 dS m^{-1} (25cm), 3.5 dS m^{-1} (50cm), 4.0 dS m^{-1} (75cm), and 4.9 dS m^{-1} (100cm). After irrigation started, only the mean value of the first horizon was higher than before irrigation (3.2 dS m^{-1})
- The most important observation was that the maximum values of EC_b changed from 3.2 dS m^{-1} to 4.9 dS m^{-1} in the first horizon and from 4.0 dS m^{-1} to 5.2 dS m^{-1} in the second horizon



Daily variation of soil EC_b at 4 depths with precipitation and irrigation data

CONCLUSION

Although the presented results cover only one season, they demonstrate the importance of monitoring soil salinity in irrigated coastal areas, especially for sensitive crops such as citrus, where elevated salt concentrations can lead not only to yield losses but also to more serious consequences such as permanent soil degradation.

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