Hydrographic indications to understand the absence of *Posidonia oceanica* in the Levant Sea (eastern Mediterranean)

BILLUR CELEBI*, ALI CEMAL GUCU*, MELTEM OK*, SERDAR SAKINAN*, EKIN AKOGLU*

Institute of Marine Sciences, Middle East Technical University, Mersin 33731, Turkey

Levant is the easternmost and the warmest basin in the Mediterranean Sea. In contrary to common belief, some recent studies indicated that the *Posidonia oceanica* does not exist in this basin presenting a clear cut border at 36 09.139 N, 33 26.476 E on the Anatolian coast. Although the reasons behind the absence of this plant have not been studied yet, it might be associated with the Surface Levantine Water mass which is characterized by higher temperature and salinity than its surrounding and underlying waters. The other reason might be water turbidity possibly increased by heavy anthropogenic disturbance on the coast and river discharges.

Present study focuses on the possible effects of turbidity, salinity and temperature on the distribution of *P. oceanica* on the Levant coast. The study has been conducted on Southern Anatolian. Some of the stations were chosen on the west of the border where *Posidonia oceanica* forms healthy meadows. The rest of the stations were located on infra-littoral zone of eastern Levant Sea where the plant is naturally absent.

As a measure of turbidity, Secchi disk depth was measured at 35 different stations on either side of the study area. The ranges of the measurements taken on the Posidonia meadows were wider than the measurements taken at non-Posidonia stations, indicating that the water clarity may not be a major hamper for the growth of this plant.

Vertical salinity and temperature measurements taken at 219 different stations covering the south coast of Turkey during the warmest period (August) of two successive years (1990 and 1991) were used to analyze significance of these parameters. The salinity on the west and east side of the Levant Sea did not represent remarkable differences. The range of salinities on the west was wider (39.0-39.7 ppt) and overlapped with the ranges on the east (39.2-39.6 ppt).

Comparison of the temperature profiles on the same stations represented more distinctive ranges between east and west, suggesting that the water bodies on the west are cooler than the water masses covering east of Levant Basin. The data at hand encouraged us to postulate that the 27.5°C is the temperature limit for the growth of P. oceanica in the Levant Sea.

To approve and improve this statement, 10 continuous water temperature recorders were deployed at 5 different stations; St-***1*** set on a meadow located at 8.3 nm west of the *P.oceanica* border and characterized as *Progressive* (Meinesz and Laurent, 1978), *TYPE I* (Giraud, 1977) and having an overtopping *Very Limpid* water mass (Pergent et al., 1995); St-***2*** located on the meadow forming the east border of *P.oceanica* in the Levant Basin; St-***3*** located at 7.2 nm east of the border; St-***4*** located on 46.5 nm east of the border; and St-***5*** located on 121.1 nm east of the border.

In each station two temp-loggers were launched at two different depths within the mixed layer and each logger was set to record temperatures with 10 min intervals. The loggers were deployed during the warmest period of the year (10 August 05 – 10 September 05).

The temperature recordings of St-1 (healthy meadow) taken at 10 min intervals were averaged over a day (00:00-24:00) and the maximum daily average temperature measured at this station was set as the maximum tolerable temperature limit (MTTL) of the *P.oceanica*. The MTTL, independently measured at two different depths (10 and 15 m) was found as 28.4°C.

Numbers of warm pulses, having higher temperatures than MTTL, along with their duration, frequency and amplitude were estimated for the rest of the stations. The temperatures exceeding the MTTL and all other pulse parameters progressively increase eastward. As the most extreme condition, the temperature of the water mass at the eastern most station (St-5) was always higher than 28.4 throughout the sampling period.

Consequently, out of three hydrological factors examined, only the temperature represented noteworthy results that may be considered as one of the growth inhibiting factors for the Posidonia oceanica in the Levant Sea.