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Cover photograph: *Posidonia oceanica* meadow, Archipelago of Pakleni Islands, Croatia (Ante Žuljević)

Session V—Seagrass physiology
Chair: Rui Santos

Quantum use efficiency by the intertidal seagrass *Zostera noltii*

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The maximum (Fv/Fm) and the effective (F'v/F'm) quantum use efficiencies of PSII were investigated in the intertidal seagrass *Zostera noltii* from Ria Formosa coastal lagoon (southern Portugal). Modulated chlorophyll fluorescence measurements were conducted monthly in both neap and spring tides over a yearly cycle. Other fluorescence parameters, such as the Stern-Volmer non-photochemical quenching (NPQ) and the novel parameter L_{NP} (which expresses the general decrease in PSII photochemical activity in the light) were derived from quantum use efficiency measurements. In all the samplings Fv/Fm presented a typical midday depression, which amplitude was higher during neap tides, when low tide occurs at noon and the plants are air-exposed. Annual patterns also emerged, revealing higher maximum quantum use efficiencies in winter and early spring, under mild temperatures and moderate irradiances. During summer months the maximum quantum use efficiency was at its lowest, most likely due to increased stress levels imposed by the combination of high temperatures and strong irradiances. Relationships between quantum use efficiency (as revealed by chlorophyll fluorescence data) and critical environmental parameters (irradiance, temperature, air exposure) were explored through multifactorial analysis.

Phosphorus cycling in Mediterranean seagrass (*Posidonia oceanica*) meadows

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Phosphorus cycling was studied in a *Posidonia oceanica* meadow in the Aegean Sea (Greece) in order to detect if increased phosphorus availability from fish farm discharges ceases seagrass phosphorus limitation and thus increases seagrass standing crop, production and phosphorus incorporation. Phosphorus sedimentation was positively related to phosphorus concentration in the sediment, leading to elevated pore water phosphate. Increased phosphorus sedimentation and pool in the sediment and in the pore water resulted in phosphorus accumulation in seagrass tissue under the cages, suggesting that the studied *P. oceanica* meadow was strongly phosphorous deficient. However, seagrass standing crop decreased exponentially with increasing phosphorus pools in pore water, sedimentary material and sediment. Leaf production and phosphorus incorporation in seagrass leaves was negatively related to phosphorus sedimentation. Net community production, respiration and gross primary production were negatively affected by increasing phosphorus pools in pore water, sedimentary material and sediment. This seagrass species seems to buffer phosphorus limitation on annual basis by nutrient uptake, translocation and mobilization, being well adapted to the oligotrophic regime in the Mediterranean, whereas it is negatively affected by excessive phosphorus inputs.