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Adaptive traits to fluvial systems of native tree European black Poplar (*Populus nigra* L.) population in Southern Italy

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This work focuses on the morphological and biomechanical traits developed by the European black poplar (*Populus nigra*) to cope with the hydraulic force and prolonged submersion periods during floods. Two riverine environments of the Cilento sub-region (Southern Italy) have been selected for this experimental study. The two sites have the same climatic and hydrological regimes. The first site is located along the Ripiti stream, characterized by a braided channel with longitudinal and transverse bars and eroding banks. The second site is located along the Badolato stream, an entrenched meandering riffle/pool channel, with low gradients and high width/depth. *P. nigra* mixed with *Salix alba* and along the Badolato stream also *Platanus orientalis*, is the dominant wooden riparian vegetation in both sites. Cuttings from adult *P. nigra* trees originated by seeds were collected and planted in the "Azienda Sperimentale Regionale Improsta" (Eboli-Salerno, Campania region). The experimental plantation was managed according to a multi-stem short rotation coppice with low external energy input and high disturbance regime generated by a 3 years rotation coppicing. The two sample stool sets exhibit statistically similar morphological traits, but different values of Young elasticity module of the shoots. A functional evaluation of the biomechanical differences was performed by measuring the bending of the individual stems under the hypothesis of complete submergence within a flow of different mean velocities, using a numerical model that predicts the bending of woody vegetation beams allowing for large deflections. The results suggest that plants with the same gene pool but coming from morphologically different riverine environments, may reflect different dominant biomechanical properties, which might be relevant for designing local sustainable management and restoration plans of rivers and riparian systems.