Invasive mesquite (*Prosopis juliflora*) reducing soil nitrogen and carbon oxides emissions during rewetting in the Dead Sea valley, Israel.

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Invasive species are modifying invaded ecosystems, changing their species composition, diversity and stability, and affecting overall ecosystem functioning. A recent survey in Israel found that multiple planted populations of mesquite (*P. juliflora*) became invasive and currently invade 690 km\(^2\) of the Dead Sea area, Negev desert, Jordan Valley and the Arava Valley. In the Jordan, the extent of area invaded by *Prosopis* is ~3 times the area in Israel (>1800 km\(^2\)), with numerous populations of *P. juliflora* invading the region around the Dead Sea, mainly in humid habitats with continuous water flow (e.g., river banks and irrigated land). Despite increasing presence and high risk of further spreading, the impact of mesquite encroachment on ecosystem N and C cycles in invaded areas of Israel and Jordan are currently unknown. We studied an established Prosopis population in Khatsason stream mouth on the western coast of the Dead Sea. We have compared emissions of nitrous and nitric oxides (N\(_2\)O and NO) and carbon dioxide (CO\(_2\)) during a rewetting event from soil under the canopy of *P. juliflora* with those from soil under the canopy of the native Red Thorn acacia (*Vachellia gerrardii*) and to the bare soils far from trees. We have found that overall dynamics of soil trace gases emissions during the rewetting were same under canopies of both, invasive and native species. Each trace gas, however, had different post-rewetting emission pattern, CO\(_2\) emission reached maximum immediately after the rewetting (~15 min), soil N\(_2\)O flux peaked ~1 hour after and soil NO emissions increased during the measurement period of ~ 5 hours without sign of decrease.

The magnitudes of emissions, however, were strikingly different under canopies of the two species. After the rewetting, soils under native *V. gerrardii* emitted ~25 times more N\(_2\)O (peak of ~90 µg N m\(^{-2}\) min\(^{-1}\)) and ~4 times more NO and CO\(_2\) (peaks of ~6 µg N m\(^{-2}\) min\(^{-1}\) and 20 × 10\(^3\) µg C m\(^{-2}\) min\(^{-1}\), respectively). Our results pointing on a potentially slowing-down of the N and C cycles under the canopy of the invasive mesquite. This is surprising because mesquite invading an ecosystem dominated by similar, at list morphologically, N-fixing acacia. Biogeochemical drivers of the observed post-rewetting emissions, however, requiring further research.