PLANT INVASION THREATENS COASTAL BLUE CARBON SEQUESTRATION

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Study Description

Smooth cordgrass (*Spartina alterniflora* Loisel.), native to North America, was artificially introduced to China's coast in 1979 for erosion control and shoreline protection. We still lack a mechanistic understanding of why soil carbon sequestration responds distinctly to cordgrass invasion in different coastal habitats. We found that soil organic carbon significantly accumulated in salt marshes but was lost in mangroves after the invasion, which can be well-explained by the pattern of organic matter decomposition. Our findings further emphasize the importance of interactions between climate, soil, and microbiota for stabilizing soil organic matter in coastal invaded wetlands.

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Photo 1. The alien smooth cordgrass can form dense single-species communities; as a consequence, space for native plant species shrinks dramatically, as in this photo (taken in Shangdong Province's Yellow River Delta, China). Compared with native plants, such as *Suaeda salsa* (L.) Pall., higher net primary productivity by this alien species contributes to the accumulation of large amounts of organic carbon in salt marshes. Photo credit: Guangliang Zhang.

Photo 2. The native species, *Suaeda salsa* (L.) Pall., forms spectacular "red carpet" landscapes, which are an important tourism resource for the locals in autumn, as seen here in Jiaozhou Bay (Shandong Province). The alien smooth cordgrass is replacing this red plant and affecting its seed production and colonization in the tidal flat. Photo credit: Guangliang Zhang.

Photo 3. *Spartina alterniflora* Loisel. (green yellow color) invades mangrove ecosystems (green color) from the seaside in the Zhangjiang River Estuary, Fujian Province, southern China. Rapid invasion of this alien species puts carbon-rich mangroves at a risk of carbon loss by promoting the decomposition of belowground soil organic matter. Photo credit: Guangliang Zhang.

These photographs illustrate the article "Habitat-specific responses of soil organic matter decomposition to *Spartina alterniflora* invasion along China's coast" by Guangliang Zhang, Junhong Bai, Christoph C. Tebbe, Laibin Huang, Jia Jia, Wei Wang, Xin Wang, Qingqing Zhao, Lixiang Wen, Fanlong Kong, Min Xi, and Qiang He published in *Ecological Applications*. https://doi.org/10.1002/eap.2741.