The threat of introduced macroalgal species arriving on Northwestern American shores associated with Japanese tsunami marine debris (JTMD)

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Due to the tsunami generated by the 2011 Great East Japan Earthquake, large amounts of debris from Japan have been arriving on NW American coasts since June 2012. Often healthy marine macroalgae are attached on JTMD, and there is a threat that they may become introduced to the coasts and disturb their ecosystems. In the PICES ADRIFT project sponsored by the Ministry of Environment, Japan, we have monitored the macroalgae on JTMD, and identified them by morphology and by using genetic markers. We have identified about 70 macroalgal species on JTMD, genetically analyzed the specimens using multiple genetic markers, and compared them with those from natural habitats in Tohoku and NW America. We have genetically examined following taxa: *Ulva* spp. (*U. compressa*, *U. lactuca*, *U. linza*, etc.), *Blidingia* spp. [Ulvophyceae]; *Feldmannia mitchelliae*, *Ectocarpus* spp., *Kuckuckia* sp., *Desmarestia* spp. (*D. japonica*, *D. viridis*, etc.), *Petalonia fascia*, *P. zosterifolia*, *Saccharina japonica*, *Scytosiphon lomentaria, S. gracilis* [Phaeophyceae]; *Chondrus giganteus, C. yendoi*, *Grateloupia turuturu*, *Palmaria palmata* and *P. mollis* [Rhodophyceae]. We have further analyzed the geographical distributions of representative haplotypes (genetic types) of the following taxa: *Ulva pertusa, Blidingia* spp., *Petalonia fascia*, *Desmarestia* spp. *Ectocarpus* spp., *Palmaria palmata*/*P. mollis*. These analyses suggest that although roughly half of the species on JTMD have already been reported to occur in the NE Pacific, many of the debris specimens are genetically distinct from NW and NE Pacific populations, and their introductions to NE Pacific coasts may cause genetic disturbance to the local populations.

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