Progressive Effects of Eastern Dwarf Mistletoe (*Arceuthobium pusillum*) Parasitism on White Spruce (*Picea glauca* (Moench) [Voss]) Physiology on Monhegan Island, Maine.
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Infection by eastern dwarf mistletoe (*Arceuthobium pusillum*), a parasitic angiosperm, is a major cause of white spruce (*Picea glauca*) mortality in coastal Maine forests. Parasitic manipulation of host cytokinin hormones facilitates disproportionate resource delivery to infected branches and delays their senescence. Consequently, the last living branches on infected trees tend to be those infected by *A. pusillum*. Previous research has found that mistletoe-induced changes in bole growth only become evident in the most severely infected trees. However, measurements of the physiological impacts of infection have been confined to lightly and moderately infected trees; the implications of severe infection remain unexplored. This study therefore seeks to quantify the effects of eastern dwarf mistletoe parasitism on white spruce physiology across the full continuum of infection severity. Measurements of photosynthetic oxygen evolution and needle morphology were performed on current- and third-year growth from infected white spruce on Monhegan Island, Maine. Needles on severely infected trees had significantly reduced photosynthetic capacities relative to lightly or moderately infected trees. Leaf mass and leaf area of needles in the most severe infection class were reduced by 50%. Photosynthetic capacities of needles on severely infected trees were significantly reduced by *A. pusillum* infection. These data suggest that a suite of negative physiological impacts correlate with previously observed changes in branch-scale growth. Future measurements of *in situ* photosynthetic gas exchange, needle pigments, needle mineral nutrient composition, sugar concentrations, and plant water relations will further contextualize these results.