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Assessing the influence of simulated ice storm-induced crown damage on nonstructural carbohydrates, wound closure, and radial growth of maple trees

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Abstract

We evaluated shoot nonstructural carbohydrate (NSC) concentrations, stem wound closure, and radial growth of sugar maple (*Acer saccharum* Marsh.) and red maple (*Acer rubrum* L.) trees in a novel ice storm experiment in which five storm treatments (0, 6.4, 12.7, and 19.1 mm of radial ice accretion in 1 year and 12.7 mm of ice in two consecutive years) were applied within a mature northern hardwood forest. We tested for changes in physiology at two levels: (1) associated with plot-level ice treatments and (2) with crown damage classes of individual trees. Few differences in NSC or wound closure associated with treatment were found. Growth decreased for red maple in the medium and high treatments and sugar maple in the high treatment but no other treatments. Changes in physiology were more evident when assessed using crown damage classes. Two NSC components were elevated in sugar and red maples with high (≥50%) crown damage. Wound closure was less for red maples with high damage, and separation among damage classes was even greater for sugar maple. Red maples with moderate (<50%) and high crown damage showed gradually declining growth, whereas sugar maples with high damage showed ~80% reduction in growth the first year after injury.

Keywords

red maple, sugar maple, basal area increment, tree rings, sugars and starch concentrations

Citation

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