

Effects of waterlogging on carbon isotope discrimination of *Larix gmelinii* during photosynthesis

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The carbon isotope discrimination during photosynthesis reflects various environmental factors, such as VPD, solar radiation, soil moisture, salinity, air pollution and so on. It has been used to estimate environmental condition, or calculation of carbon isotope mass balance equation to know a flow of carbon. It is well known that soil moisture is one of the major factors controlling carbon isotope discrimination: discrimination decreased under drought condition due to a decrease of stomatal conductance. On the other hand, there is almost no research on carbon isotope discrimination under extremely wet condition. *Larix gmelinii* is one of the major species of larch trees, which constitute eastern Siberian Taiga. In 2007, extreme wet event has been reported near Yakutsk. In this research, pot experiment with *Larix gmelinii* saplings was conducted to obtain carbon isotope discrimination during photosynthesis under waterlogging condition which may happen more frequently in the future. Under waterlogging condition, both photosynthesis rate and stomatal conductance of all three larch saplings used for experiment decreased, while only one sapling among three showed clear decrease in carbon isotope discrimination. Although the decrease in carbon isotope discrimination was not so clear, needles on current year stem, which seemed to be formed with C fixed during the experiment, showed slightly higher $\delta^{13}\text{C}$ in waterlogging treatment than that in control. This result suggests that waterlogging condition makes stomatal conductance decreased.

Keywords: carbon isotope discrimination, photosynthesis, stomatal conductance, waterlogging, larch, experiment