Method predicts impact of low temperature on eucalyptus trees widely used for forestry plantations

July 5 2023

Researchers at the University of Tsukuba established a model for predicting cold damage to Eucalyptus trees during winter, which are used as plantation trees worldwide. They used a statistical modeling approach based on field trials and meteorological data. Credit: University of Tsukuba

Globally, eucalyptus trees are widely used as industrial forestry plantations owing to their considerable biomass production potential and ability to serve as carbon dioxide sinks. However, their susceptibility to cold temperatures restricts the suitable areas for plantations.

In Japan, the northern Kanto region, including Ibaraki Prefecture, which encompasses the University of Tsukuba campus, marks the northern boundary for eucalyptus plantation-based cultivation. Nevertheless, the precise climatic conditions determining the feasibility of eucalyptus tree plantations have yet to be fully explored.

A study, published in *Scientific Reports*, focused on Eucalyptus globulus, a representative species in the genus Eucalyptus, which was cultivated in a small field located in Tsukuba City, Ibaraki Prefecture, Japan. Over a six-year period, the trial included monitoring of leaf photosynthetic capacity as an indicator of individual plant health during winter. A regression model was developed to establish the optimal relationship between the observed indices and temperature data.

The resulting model successfully explained >80% of the eucalyptus leaf health based on the number of days, with a maximum daily temperature of