About.md

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June 26, 2020

Predictive Biomass Yield Models

Through the compilation of yield data, edaphic and climatic conditions from scientific literature into a database, a linear mixed-effects model was created to predict biomass yield for each dedicated biomass crop: Switchgrass, Miscanthus, Poplar and Willow. The data were refined based on growing crops in Nova Scotia, Canada, so appropriate climatic conditions were determined by plant hardiness zones (PHZ).

The values for precipitation and growing degree days are reported for a typical Nova Scotia growing season: April through October.

Precipitation - total precipitation over the growing season. Reported in mm.

Growing Degree Days - accumulation of heat units that contribute to plant growth based on a specific base temperature. T_{MAX} is the maximum daily temperature (°C), T_{MIN} is the minimum daily temperature and T_{BASE} is the base temperature (°C), representing the lowest possible temperature where plant growth still occurs.

$$GDD = \frac{T_{MAX} + T_{MIN}}{2} - T_{BASE}$$